



Inside you'll find:

- Complete student pages from Amplify Desmos Math
- Student pages from requested domains, partially designed

For Review Only.
Not Final Format.

Amplify Desmos Math
NEW YORK

Grade 7

Student Edition Sampler

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today’s students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

Amplify Desmos Math is based on the Illustrative Mathematics (IM) curriculum. IM 6–8 Math was originally developed by Open Up Resources and authored by Illustrative Mathematics, and is © 2017–2019 Open Up Resources. Additional adaptations and updates to IM 6–8 Math are © 2019 Illustrative Mathematics. IM 9–12 Math is © 2019 Illustrative Mathematics. IM 6–8 Math and IM 9–12 are licensed under the Creative Commons Attribution 4.0 International license (CC BY 4.0). Additional modifications contained in Amplify Desmos Math are © 2020 Amplify Education, Inc. and its licensors. Amplify is not affiliated with the Illustrative Mathematics organization.

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Welcome reviewer

Welcome to your Amplify Desmos Math New York Student Edition sampler!

Amplify Desmos Math New York is the result of two groundbreaking research and development efforts in K–12 mathematics instruction led by the Amplify and Desmos Classroom teams. Merging the two teams in 2022 enabled us to build a new curriculum around the idea that all students deserve to engage in high-quality grade-level mathematics every day. Based on Illustrative Mathematics® IM K–12 Math™, Amplify Desmos Math New York combines strong pedagogy, arresting design, and forward-looking collaborative technology to deliver a classroom experience that keeps students engaged and asking productive questions.

Every lesson in the Amplify Desmos Math digital platform has a corresponding lesson in the print teacher and student editions. While we are in the process of finalizing the print materials, we have provided exemplars highlighting the unique design and ease of use of the Amplify Desmos Math print resources. To provide content covering your specific domain requests, in this physical sampler we have included both robust Amplify Desmos Math student pages and partially designed student pages. However, all of the lessons can be reviewed in their complete forms online.

All Amplify Desmos Math lessons include:

- Easy-to-follow lesson plans, tested in classrooms across the country.
- Clear teaching suggestions and strategies, including math language routines.
- Recommended differentiation moves and practice sets.

Diagnostic, formative, and summative assessments are provided with each unit along with lesson-level checks for understanding.

Amplify and New York City have a long history of partnering to provide equitable, high-quality instruction to our next generation of leaders. We look forward to continuing this partnership with New York City Public Schools in middle school mathematics.



—Jason Zimba and the
Amplify Desmos Math team



Amplify Desmos Math New York

Helping New York City teachers develop and celebrate student thinking

Deep and lasting learning occurs when students are able to make connections to prior thinking and experiences. This requires teachers to deliver math instruction that balances exploration and explanation, and that puts student thinking at the center of classroom instruction.

Amplify Desmos Math students are invited to explore the math that fills their everyday lives, while strengthening their knowledge of math facts, procedural skills, and conceptual knowledge. Using the Amplify Desmos Math print and digital lesson plans, teachers can confidently guide and instruct as they build on students' understandings to help them develop a better grasp of mathematics.

Amplify Desmos Math is a **truly student-centered program** built around three core tenets:

1 A strong foundation in **problem-based learning** is critical to developing deep conceptual understanding, procedural fluency, and application.

Students are introduced to interesting problems and leverage both their current understandings and problem-solving strategies to develop reasonable answers. The learning experience is an active one that leads students to explore, notice, question, solve, justify, explain, represent, and analyze. Teachers guide the process, supporting synthesis and sensemaking at the end of each lesson.

2 Technology can provide **ongoing, enriched feedback** that encourages students to persevere in problem solving.

Especially when new ideas are being introduced, Desmos Classroom technology shows students the meaning of their thinking in context, interpreting it mathematically rather than reducing it to a question of right or wrong. This creates a culture of going deep with mathematics and students as doers of mathematics, so that as learning progresses and correctness is the goal, incorrect answers become objects of curiosity rather than embarrassment. This information in response to student ideas is what we call "enriched feedback." Amplify Desmos Math New York offers more enriched feedback than any other math program.

3 A commitment to **access and equity** should underpin every development decision.

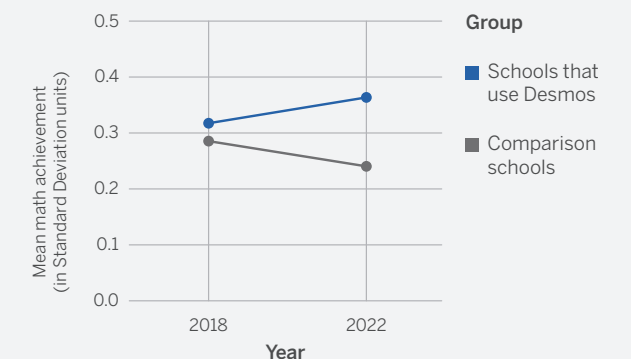
All students can dive into problems on their own, and activities are designed to honor different approaches. Activities rely on collaboration and lots of hands-on, experiential learning.

And the program works.

Amplify Desmos Math New York expands on the Desmos Math 6–8 curriculum, which was recently proven to increase average math achievement in a study of more than 900 schools in nine states led by WestEd.



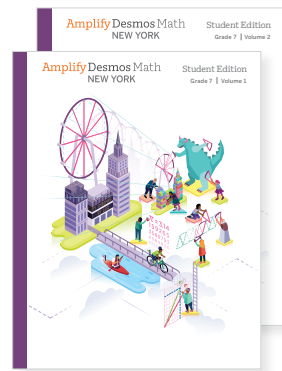
Mean Math Achievement for Desmos Schools and Matched Comparison Schools in 2018 and 2022



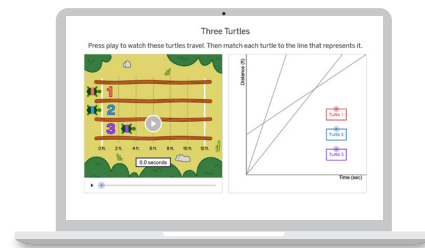
The Effect of Desmos Math Curriculum on Middle School Mathematics Achievement in Nine States. WestEd., (McKinney, D., Strother, S., Walters, K. & Schneider, S., 2023).

Amplify Desmos Math New York program resources

Student bundle includes:



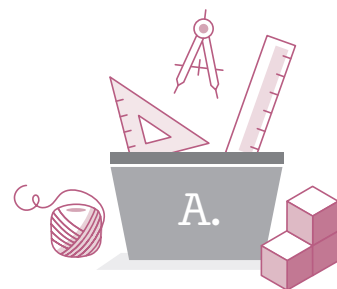
NY Student Edition, multivolume, consumable



NY Digital Experience (English and Spanish), featuring:

- Interactive Student Activity Screens
- Enriched feedback
- Collaboration tools

Optional:

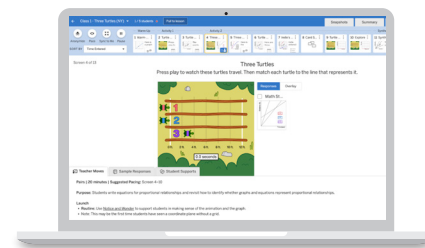


Middle School Manipulative Kit (Grades 6–8)

Teacher bundle includes:



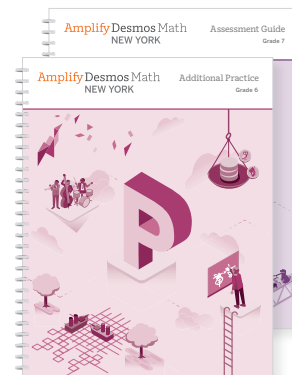
NY Teacher Edition, multivolume, spiral-bound



NY Digital Experience (English and Spanish), featuring:

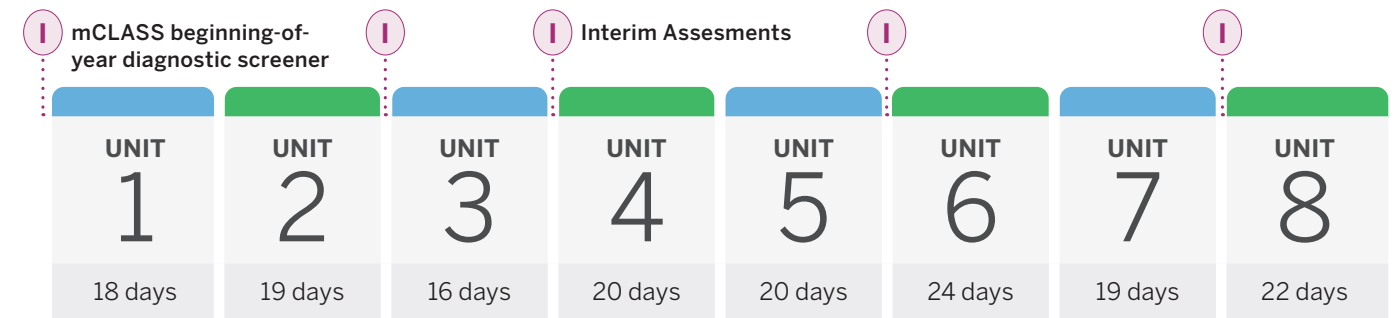
- Facilitation and progress monitoring tools
- Presentation Screens
- Instructional supports
- Assessment and practice item banks

Extra Practice and Assessment Blackline Masters

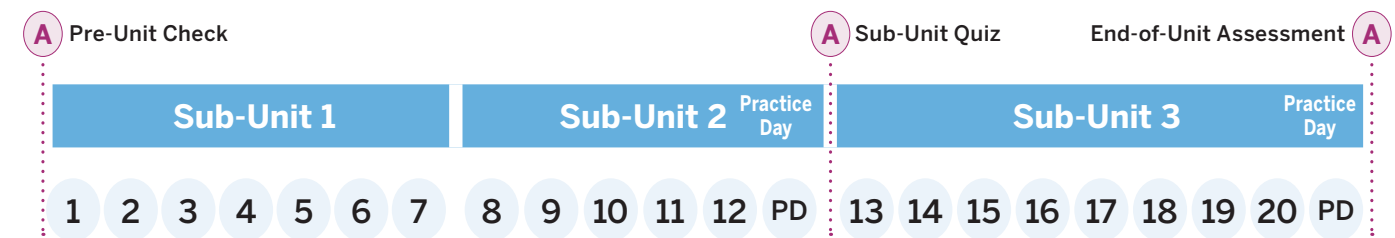


Program architecture

Course

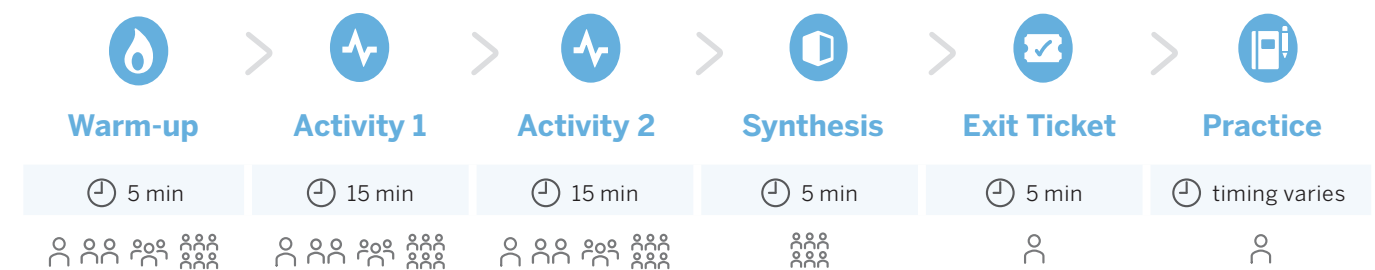


Unit



Note: The number of sub-units and lessons vary from unit to unit; this depiction shows the general structure of a unit.

Lesson



Note: The number of activities and timing vary from lesson to lesson; this depiction shows the general structure of a lesson.

Key:
 ○ Independent ○○ Small Groups
 ○○ Pairs ○○○ Whole Class

Unit 1 Scale Drawings

Ratios are all around us. You have used ratios to solve all kinds of real-world problems. But what do ratios have to do with geometry? You'll explore how ratios are used to resize images and figures, making them smaller or larger. Resizing can help you make more sense of what you're looking at.


Pre-Unit

Getting to Know Each Other

 Pre-Unit Check

Sub-Unit 1 Scaled Copies


- 1.01 Scaling Machines | What Are Scaled Copies?
- 1.02 Scaling Robots | Lengths and Scaled Copies
- 1.03 Make It Scale | Drawing Scaled Copies
- 1.04 Scale Factor Challenges | Effects of Scale Factors
- 1.05 Tiles | Scaling and Area

 Practice Day 1

 Quiz

Sub-Unit 2 Scale Drawings

- 1.06 Introducing Scale | Comparing Scale Factor and Scale
- 1.07 Will It Fit? | Scale Drawings
- 1.08 Scaling States | Creating Scale Drawings
- 1.09 Scaling Buildings | Same Object, Different Scales
- 1.10 Room Redesign | Choosing Your Own Scale

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 2 Introducing Proportional Relationships

Have you ever wondered which car can drive the fastest, which recipe contains the most sugar, or even how many balloons it would take to float an object? In this unit, you will explore proportionality and how it can be useful when making comparisons about situations we come across in our daily life.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Proportional Relationships in Tables

- 2.01 Paint | Using Equivalent Ratios
- 2.02 Balloon Float | Introducing Proportional Relationships With Tables
- 2.03 Sugary Drinks | Constant of Proportionality

Sub-Unit 2 Proportional Relationships in Equations

- 2.04 Robot Factory | Proportional Relationships and Equations
- 2.05 Snapshots | More Equations of Proportional Relationships
- 2.06 Two and Two | Two Equations for Each Relationship
- 2.07 All Kinds of Equations | Equations of Proportional Relationships

 Practice Day 1

 Quiz

Sub-Unit 3 Proportional Relationships in Graphs

- 2.08 DinoPops | Introducing Graphs of Proportional Relationships
- 2.09 Gallon Challenge | Interpreting Graphs of Proportional Relationships
- 2.10 Three Turtles | Proportional Relationships and Graphs

Sub-Unit 4 Using Proportional Relationships

- 2.11 Four Representations | Connecting Descriptions, Tables, Graphs, and Equations
- 2.12 Water Efficiency | Let's Put It to Work

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 3 Measuring Circles


Circles are round and come in many different sizes. But what else makes a shape a circle? Do circles have anything in common with squares? How do you describe the size of a circle? One way to compare circles is by measuring the distance around the circle. In this unit, you will measure circles in a variety of ways and describe their size using these measurements.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Circumference of a Circle


- 3.01 Toothpicks | Perimeter and Proportional Relationships
- 3.02 Is It a Circle? | Parts of a Circle
- 3.03 Measuring Around | Estimating and Calculating Circumference
- 3.04 Perimeter Challenges | Calculating Perimeters of Complex Shapes

 Practice Day 1

 Quiz

Sub-Unit 2 Proportional Relationships in Equations

- 3.05 Area Strategies | Estimating and Calculating Area
- 3.06 Radius Squares | Exploring Circle Area
- 3.07 Why Pi? | Relating Area to Circumference
- 3.08 Area Challenges | Calculating Areas of Complex Shapes
- 3.09 Circle vs. Square | Calculating Area Given Perimeter

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 4 Proportional Relationships and Percentages

Recall that a percentage is another way to represent the ratio of a number to 100. You have calculated the percent of a number in Grade 6. Now, watch what happens when a quantity changes by a percentage.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Percentages as Proportional Relationships


- 4.01 Mosaics | Working With Fractions and Percentages
- 4.02 Peach Cobbler | Rates and Ratios With Fractions
- 4.03 Sticker Sizes | Revisiting Proportional Relationships
- 4.04 More and Less | Percent Increase and Decrease With Tape Diagrams
- 4.05 All the Equations | Percent Increase and Decrease With Equations
- 4.06 100% | Percent Increase and Decrease With Double Number Lines
- 4.07 Percent Machines | Calculating Unknowns With Percentages

 Practice Day 1

 Quiz

Sub-Unit 2 Applying Percentages

- 4.08 Tax and Tip | Multistep Percent Problems
- 4.09 Minimum Wage | Real-World Situations Involving Percent Increase, Part 1
- 4.10 Cost of College | Real-World Situations Involving Percent Increase, Part 2
- 4.11 Bookcase Builder | Percent Error
- 4.12 Posing Percent Problems | Analyzing Data Using Percentages
- 4.13 Decimal Deep Dive | Writing Fractions as Decimals

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 5 Operations With Positive and Negative Numbers

Positive and negative numbers are used in our everyday lives to describe many situations. How much warmer or cooler will it get as the day goes on? What will the new temperature be? What is a diver's depth in a pool? What is the difference between his depth and the ring he wants to collect at the bottom of the pool? In this unit, you will further explore performing operations with positive and negative numbers to answer everyday questions like these.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Adding and Subtracting


- 5.01 Floats and Anchors | Representing Adding and Subtracting
- 5.02 More Floats and Anchors | Adding and Subtracting Integers
- 5.03 Bumpers | Adding and Subtracting Rational Numbers
- 5.04 Draw Your Own | Number Lines and Expressions
- 5.05 Number Puzzles | Practice With Adding and Subtracting

 Practice Day 1

 Quiz 1

Sub-Unit 2 Multiplying and Dividing

- 5.06 Floating in Groups | Representing Multiplying and Dividing
- 5.07 Back in Time | Position, Rate, and Time
- 5.08 Speeding Turtles | Multiplying and Dividing Signed Numbers
- 5.09 Expressions | Variable Expressions
- 5.10 Integer Puzzles | Practice With All Four Operations

 Practice Day 2

 Quiz 2

Sub-Unit 3 Applying Operations

- 5.11 Changing Temperatures | Real-World Situations Involving Positive and Negative Numbers, Part 1
- 5.12 Arctic Sea Ice | Real-World Situations Involving Positive and Negative Numbers, Part 2
- 5.13 Solar Panels and More | Real-World Situations Involving Positive and Negative Numbers, Part 3

End-Unit

 End-of-Unit Assessment

Unit 6 Expressions, Equations, and Inequalities

Numbers are great, but they will not get us where we are going in this unit. It will take letters, symbols, and drawings to represent the varied and diverse mathematical ideas of algebraic thinking.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Equations and Tape Diagrams

- 6.01 Toothpicks and Tiles | Nonproportional Relationships
- 6.02 Smudged Receipts | Connecting Contexts and Tape Diagrams
- 6.03 Equations | Representing Contexts With Tape Diagrams and Equations
- 6.04 Seeing Structure | Practice With Tape Diagrams and Equations

Sub-Unit 2 Solving Equations


- 6.05 Balancing Moves | Introduction to Balanced Hangers
- 6.06 Balancing Equations | Solving Equations With Balanced Hangers
- 6.07 Keeping It True | Solving Equations
- 6.08 Factoring and Expanding | Options for Solving One Equation
- 6.09 Always-Equal Machines | Equivalent Expressions
- 6.10 Collect the Squares | Adding Expressions
- 6.11 Equation Roundtable | Solving Equations by Adding Terms and Expanding
- 6.12 Community Day | Using Equations to Solve Problems

 Practice Day 1

 Quiz

Sub-Unit 2 Inequalities

- 6.13 Saw the Signs | Inequalities on the Number Line
- 6.14 Unbalanced Hangers | Solutions to Inequalities
- 6.15 Budgeting | Solving Inequalities in Context
- 6.16 Shira the Sheep | Solving Inequalities With Positive and Negative Numbers
- 6.17 Write Them and Solve Them | Modeling With Inequalities

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 7 Angles, Triangles, and Prisms

This unit is about the math of what can be seen and what can be held. Get ready to measure, build, and slice your way through an array of geometric figures.

Pre-Unit


 Pre-Unit Check

Sub-Unit 1 Angle Relationships

- 7.01 Pinwheels | Exploring Angles
- 7.02 Friendly Angles | Complementary and Supplementary Angles
- 7.03 Angle Diagrams | Vertical Angles and Equations
- 7.04 Missing Measures | Writing Equations and Solving Problems With Angle Relationships

Sub-Unit 2 Drawing Triangles


- 7.05 Can You Build It? | The Triangle Inequality
- 7.06 Is It Enough? | Building Polygons Given Side Lengths
- 7.07 More Than One? | Building Triangles With Technology
- 7.08 Can You Draw It? | Drawing Triangles With Rulers and Protractors

 Practice Day 1


 Quiz

Sub-Unit 3 Solid Geometry

- 5.09 Slicing Solids | Describing Cross Sections
- 5.10 Simple Prisms | Using Base Area to Calculate Volume
- 5.11 More Complicated Prisms | Calculating Volumes of Right Prisms
- 5.12 Surface Area Strategies | Surface Area of Right Prisms
- 5.13 Popcorn Possibilities | Applying Volume and Surface Area

 Practice Day 2

End-Unit

 End-of-Unit Assessment

Unit 8 Probability and Sampling

It is impossible to see into the future, but that should not stop us from trying, should it? Making predictions — taking limited information and making our best guess about what will happen — is all about knowing what is possible, what is impossible, and what is likely.

Pre-Unit

 Pre-Unit Check

Sub-Unit 1 Probability

- 8.01 How Likely? | Chance Experiments
- 8.02 Prob-bear-bility | Intro to Probability
- 8.03 Mystery Bag | Predicting Sample Spaces
- 8.04 Spin Class | Repeated Experiments
- 8.05 Is It Fair? | Comparing Probabilities and Experiments
- 8.06 Fair Games | Multistep Events
- 8.07 Weather or Not | Estimating Probabilities Using Simulations
- 8.08 Simulate It! | Designing Simulations

 Practice Day 1

 Quiz

Sub-Unit 2 Sampling

- 8.09 Car, Bike, or Train? | Using Mean and MAD to Compare Groups
- 8.10 Crab Island | Sampling From Large Populations
- 8.11 Headlines | Sampling Bias
- 8.12 Flower Power | Using Percentages to Predict Populations
- 8.13 Plots and Samples | Using Median and IQR to Make Predictions
- 8.14 School Newspaper | Comparing Populations
- 8.15 Asthma Rates | Putting It All Together

 Practice Day 2

End-Unit

 End-of-Unit Assessment

GRADE 7

Amplify Desmos Math
NEW YORK

Student Edition Sample Lessons

In this section, two lesson samples showcase the full print support for all lessons in the program, including Student Edition pages for recommended digital lessons. All Student Edition lessons will be created following this structure and design for delivery prior to the 2024-2025 school year.

Contents of this lesson:

- **Student Edition Overview**
- **Lesson 2.10: Three Turtles**
Proportional Relationships and Graphs
Digital recommended lesson
- **Lesson 6.14: Unbalanced Hangers**
Solutions to Inequalities
Digital recommended lesson

Equitable access with student materials

Every lesson in Amplify Desmos Math New York has a corresponding Student Edition page, ensuring equitable access for for all students.

- A print-based option is always available for students who need it, even for digital-recommended lessons.
- Student pages are closely aligned to digital Student Activity Screens, with screen-by-screen alignment in problem numbering.
- There's ample physical space provided for problem-solving and note-taking, even when students are on devices.



What if your students asked to do more math?

Amplify Desmos Math New York lessons are powerful in their ability to elicit student thinking and spark interesting and productive discussions.

The lessons pose problems that invite a variety of approaches with their dynamic and interactive learning experiences on computers, as well as experiences on paper that are flexible, creative, and engaging.

As students work online, they interact with visuals and simulations that show how their thinking and decisions play out. When appropriate, students will automatically see other students' responses and engage in collaborative math discussions.

Grade 6

In this activity students plot points to navigate the marble through the maze to collect the star.

Grade 7

In this activity students explore positive and negative integer operations using the up and down movement of a submarine.

Grade 8

In this activity students create rate, distance, and time equations based on turtle races.

TRY IT OUT

Start your review at
amplify.com/math-review-nyc
 Student Edition Sampler | 5

Unit 4
Lesson 8

Name: _____ Date: _____ Period: _____

Potting Soil
 Let's find out how much soil we need to fill a planter.

Warm-Up
 Habib says $2 \div \frac{1}{3}$ represents the brick situation. Inola says $2 \div \frac{1}{3}$ represents the flower situation.

Discuss why are they both correct?
Pause to test your results.

Lesson 8 Potting Soil 387

Unit 6
Lesson 16

Name: _____ Date: _____ Period: _____

Subway Fares
 Let's use tables, graphs, and equations to help customers compare subway fares.

Warm Up
 In Metropolis, there are three ticket options to ride the bus or subway.

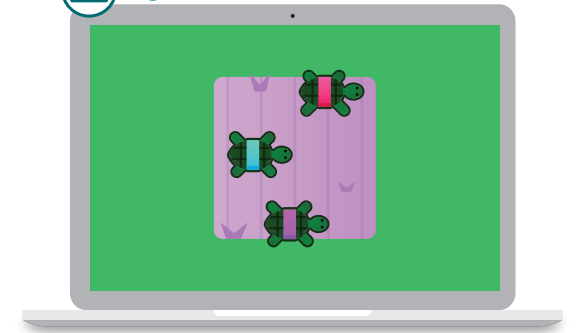
Option 1 Regular Fare	Option 2 Unlimited 7-Day Pass	Option 3 Reduced Fare
TICKET \$2.50 PER RIDE	TICKET \$30 UNLIMITED 7-DAY PASS	TICKET 50% REDUCED FARE PASS

For each option, how much will it cost to ride the subway 3 times?

Lesson 16 Subway Fares 387

Digital recommended lesson

Print lesson



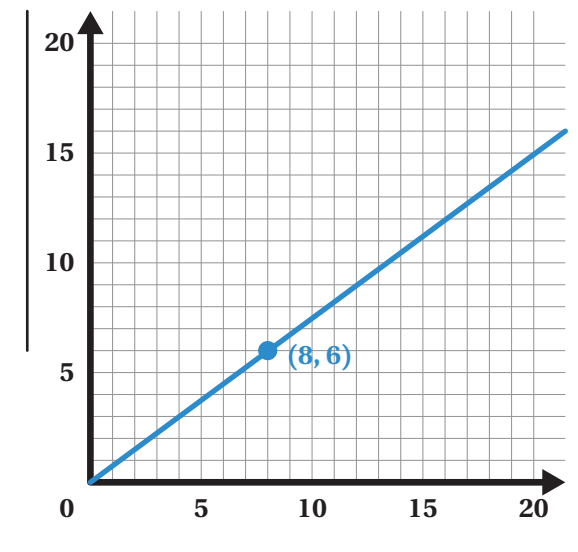
Three Turtles

Let's use graphs and equations to compare proportional relationships.

Warm-Up

1 Here is a graph that represents a proportional relationship.

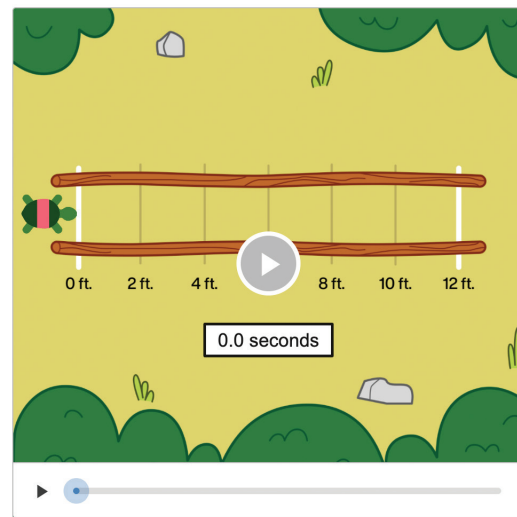
a Label the axes with any quantities you'd like.



b Write a true statement about the quantities based on the graph.

Turtle Table

2 Let's watch an animation.

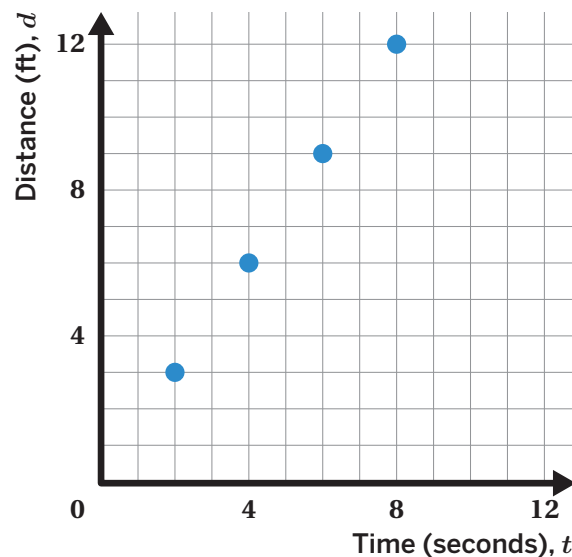


What is a constant of proportionality for this relationship?

Time (sec)	Distance (ft)
2	3
4	6
6	9
8	12

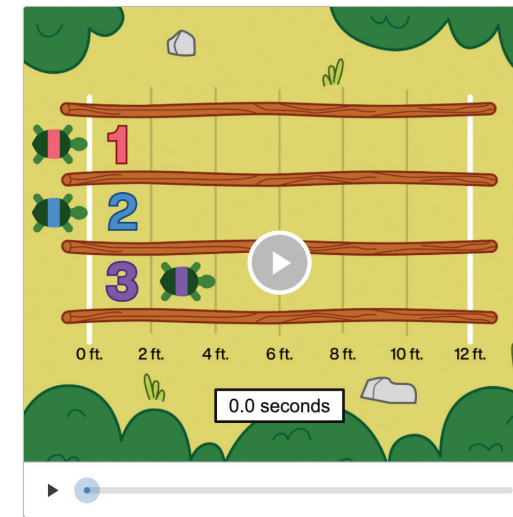
3 The points from the table are plotted on the graph.

Write an equation for this relationship. Use d for distance and t for time.

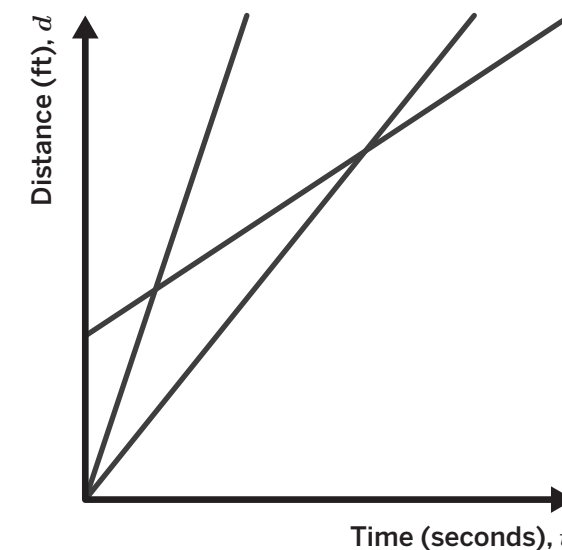


Three Turtles

4 Let's watch another animation.



Match each turtle to the line that represents it.



5 Decide whether each turtle's distance-time relationship is proportional.

Turtle	Equation	Is the relationship proportional?
Turtle 1	$d = 3t$
Turtle 2	$d = \frac{2}{3}t + 4$
Turtle 3	$d = 1.25t$

Explain your thinking.

Three Turtles (continued)

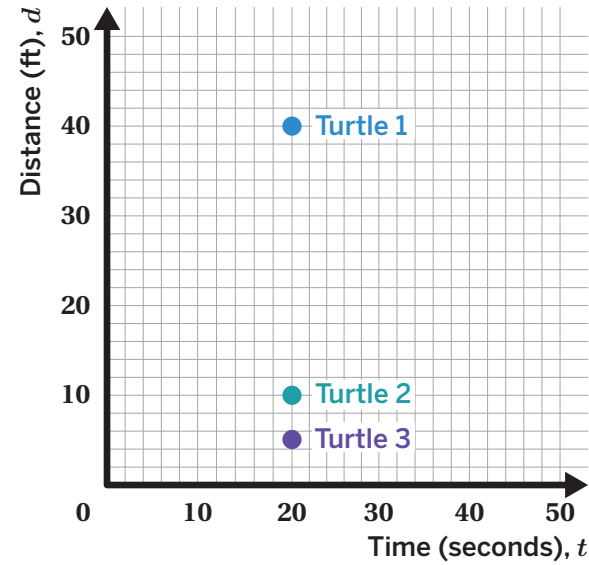
6 Here are three new turtles and their distances at 20 seconds.

- Turtle 1 is 40 feet from the start.
- Turtle 2 is 10 feet from the start.
- Turtle 3 is 5 feet from the start.

These are all proportional relationships.

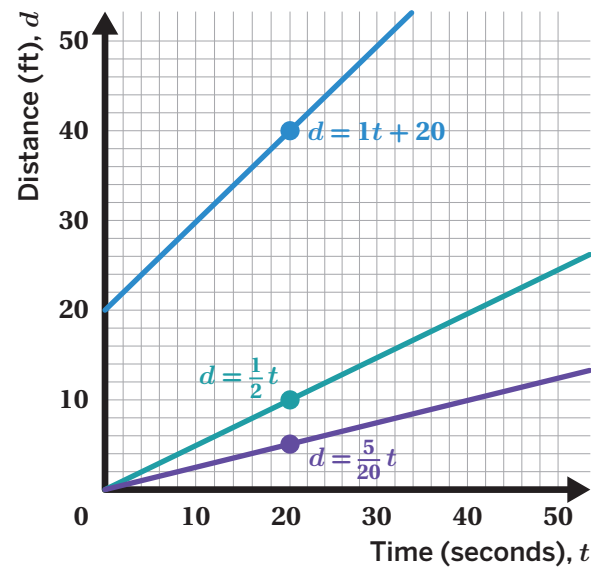
Write an equation for each turtle using d for distance and t for time. One has been done for you.

Turtle	Equation
Turtle 1	
Turtle 2	$d = \frac{1}{2}t$
Turtle 3	



7 Here are three distance-time relationships.

- a** Which of these relationships is *not* proportional? Explain your thinking.
- b** What does the point $(0, 20)$ mean for the turtle with the graph that includes this point?



8 Card Sort: You will use a set of cards. Sort them into three groups that each represent the same turtle.

Group 1	Group 2	Group 3

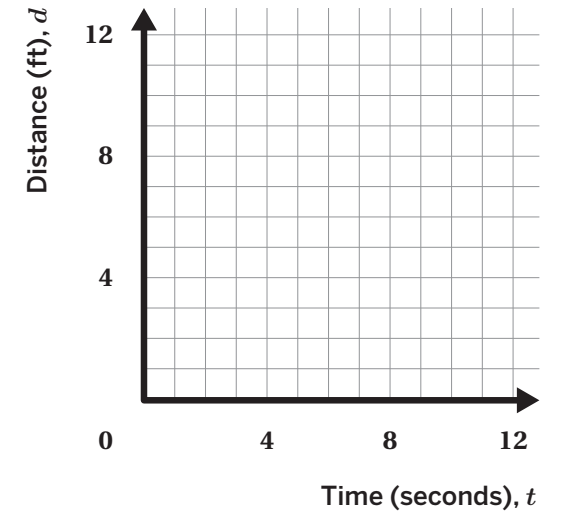
Name: _____ Date: _____ Period: _____

Turtle Tomfoolery

9 Create your own 12-foot turtle race by drawing a line for each of the three turtles.

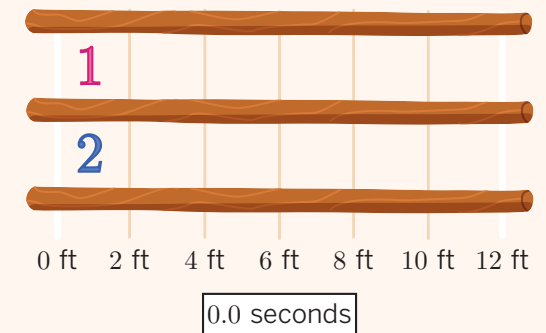
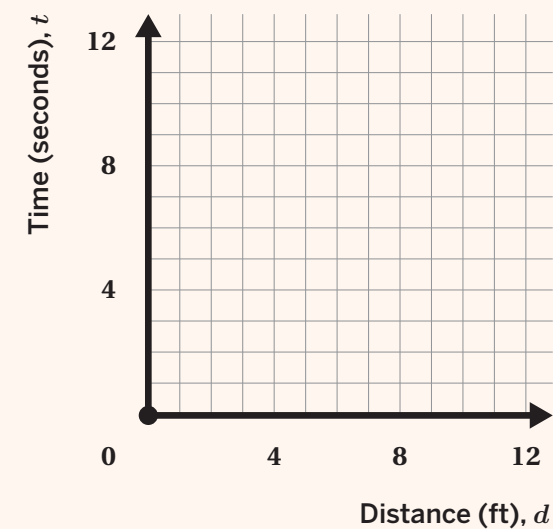
Can you make a turtle that . . .

- Stays still?
- Goes backward?
- Finishes at the same time as another turtle?



You're invited to explore more.

10 Draw lines representing the turtles so that Turtle 1 is faster than Turtle 2. Take note of the axis labels on the graph.

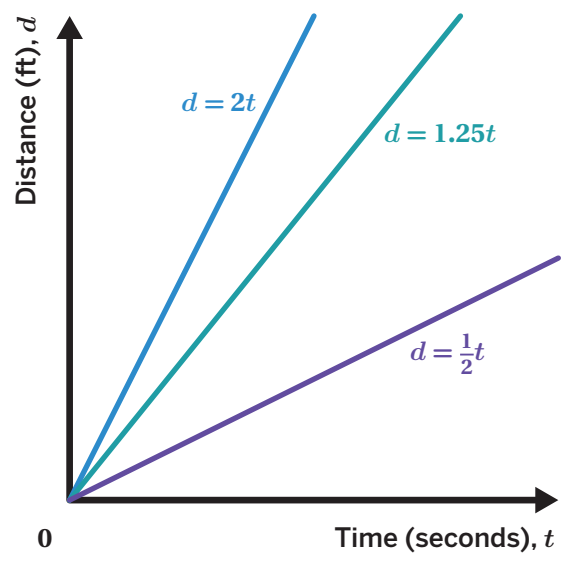


11 Synthesis

This graph shows the distance traveled over time by three different turtles.

Discuss the following questions. Then select one question and record your response.

1. How can you tell from the graphs which turtle moved the fastest?

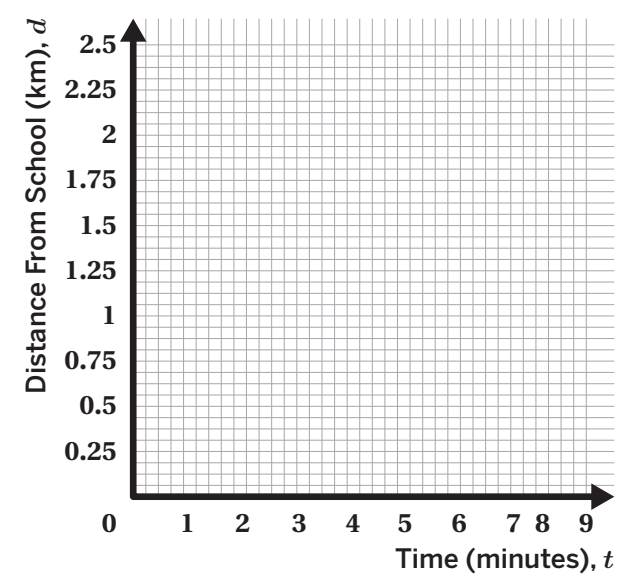


2. How can you tell from the equations which turtle moved the fastest?

For Problems 1–4, use this information. Mia and Jamal bike home from school at a steady pace. Mia bikes 1.25 kilometers and it takes her 4 minutes. Jamal bikes 1.75 kilometers and it takes him 7 minutes.

1. Create two lines that represent Mia and Jamal's journeys.

2. Plot a point on each line when $t = 1$.



3. Determine each value of r , the constant of proportionality.

Line	r
Mia	
Jamal	

4. Who bikes faster? Explain your thinking.

5. The point $(3, \frac{6}{5})$ lies on a graph representing a proportional relationship. Select *all* of the points that also lie on the same graph.

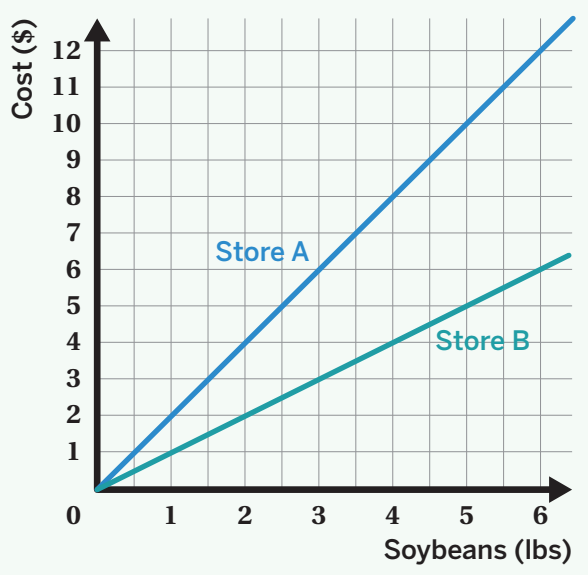
- A. $(1, 0.4)$
- B. $(1.5, \frac{6}{10})$
- C. $(\frac{6}{5}, 3)$
- D. $(4, \frac{11}{5})$
- E. $(15, 6)$

Summary

Graphs of proportional relationships can be compared when on the same coordinate plane. The steeper the line, the greater the constant of proportionality.

For example, this graph shows the cost of soybeans at two different stores.

- On the graph, the line representing Store A is steeper than the line representing Store B, so it has a greater constant of proportionality.
- In context, this means Store A charges more per pound than Store B because its line is steeper.
- Store A charges \$2 per pound, while Store B charges \$1 per pound. The constant of proportionality of Store A is greater than that of Store B.

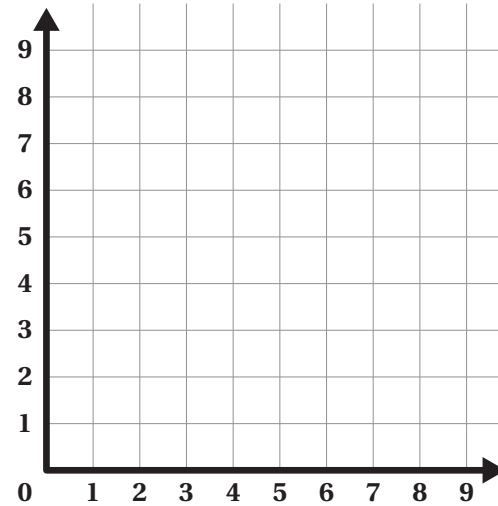


Practice

Name: _____ Date: _____ Period: _____

For Problems 6–9, use this information. At a supermarket, you can fill your own honey container and pay by the ounce. A customer buys 12 ounces of honey for \$5.40.

- How much does the honey cost per ounce?
- How much honey can you buy for \$1 dollar?
- Write two different equations that represent this situation. Use h for ounces of honey and c for cost in dollars.
- Graph the line of one of your equations from the previous screen. Be sure to label the axes.



Spiral Review

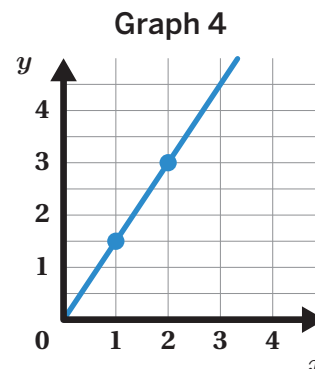
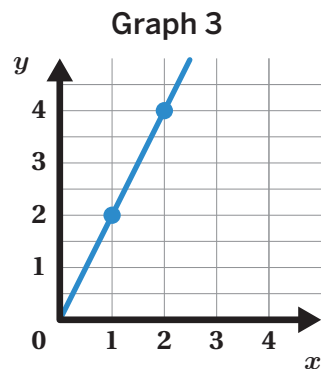
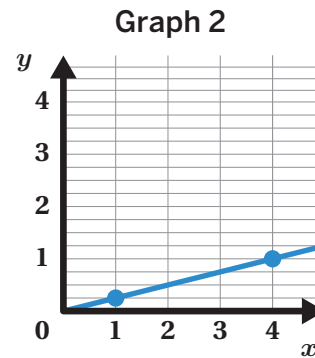
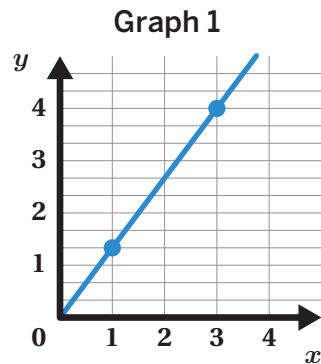
For Problems 10–13, match each equation with its graph.

10. $y = \frac{1}{4}x$

11. $y = \frac{3}{2}x$

12. $y = 2x$

13. $y = \frac{4}{3}x$



Reflection

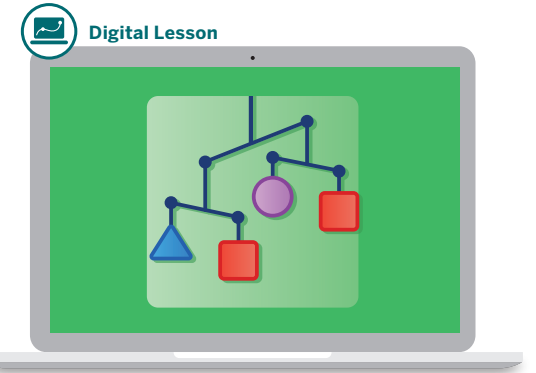
- Put a smiley face next to a question you were stuck on and then figured out.
- Use the space below to ask one question you have or to share something you are proud of.

Unit 6 Lesson 14

Name: _____ Date: _____ Period: _____

Unbalanced Hangers

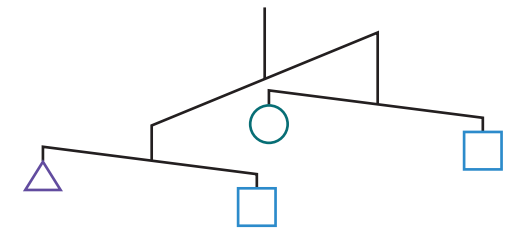
Let's solve inequalities using hanger diagrams.



Warm-up

- Order the shapes in the hanger from lightest to heaviest.

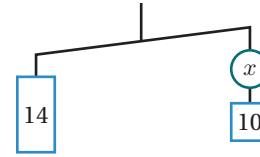
	Lightest
Heaviest	



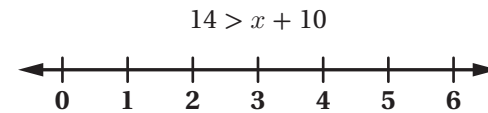
Explain how you decided which shape was the lightest.

Unbalanced Hangers

- 2 Here is a hanger that is not balanced. What is one possible value for the weight of x ?



- 3 Plot your response from the previous problem on the number line.



Determine at least two more possible weights and plot those on the number line.

- 4 Describe *all* of the possible weights for x that keep the right side lighter.

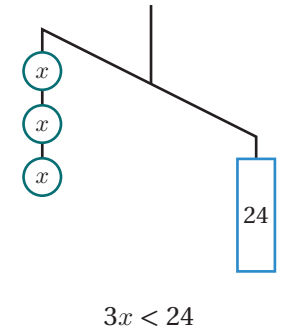
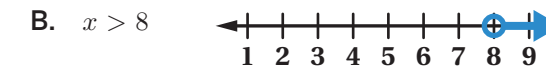
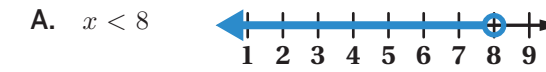
Name: _____ Date: _____ Period: _____

Unbalanced Hangers (continued)

The *solutions to an inequality* include all of the possible values that make an inequality true.

- 5 This hanger represents the inequality $3x < 24$.

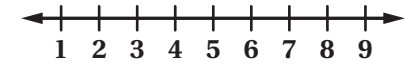
What are the solutions to this inequality?



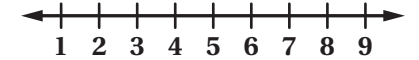
- 6 Here are three statements. $3x < 24$ $3x = 24$ $3x \leq 24$

Discuss How are they alike? How are they different?

Solve the equation $3x = 24$. Graph the solution.

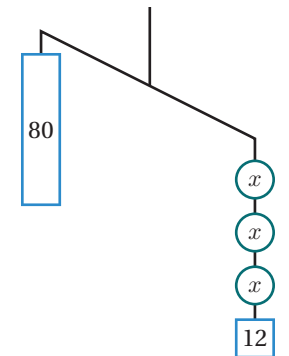


Use your solutions to $3x < 24$ and $3x = 24$ to determine and graph the solution to $3x \leq 24$.



- 7 This hanger represents the inequality $80 < 4x + 12$. Here are three possible solutions to this inequality and their graphs.

Possible solution	Correct or incorrect
$17 > x$	
$17 = x$	
$17 < x$	

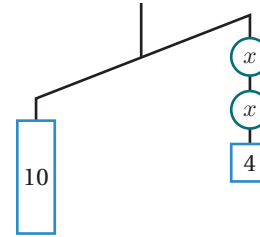


Discuss What do the checks and Xs on the graphs mean?

Solving Inequalities

8 What are the solutions to the inequality $10 \geq 2x + 4$?

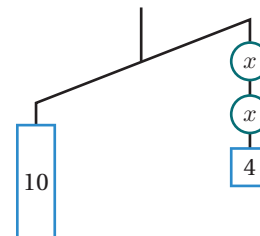
Use the hanger diagram if it helps with your thinking.



9 Jasmine and Terrance solve the inequality $10 \geq 2x + 4$ from the previous problem.

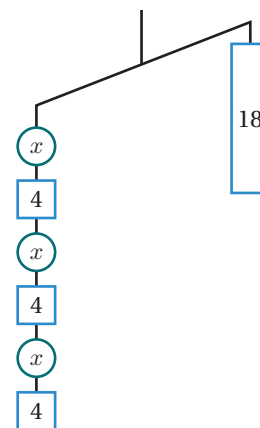
Jasmine says the solutions are $x \leq 3$.
Terrance says the solutions are $3 \geq x$.

Who is correct? Explain your thinking.



10 What are the solutions to the inequality $3(x + 4) \geq 18$?

Use the hanger diagram if it helps with your thinking.



Repeated Challenges

11 With your partner, decide who will solve the inequalities in Column A and who will solve the ones in Column B. The solutions to the inequalities in each row are the same. After each inequality, compare your solutions and resolve any differences.

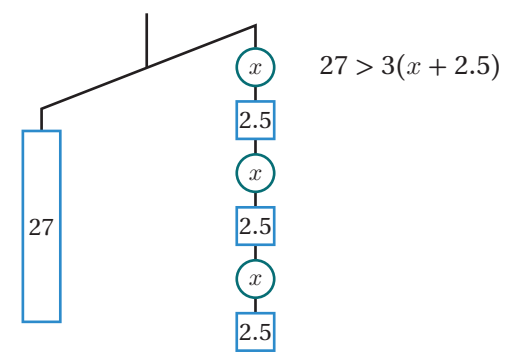
Column A	Column B
$4x + 2 \leq 10$	$6x + 4 \leq 16$
.....
$12 > 3(x + 1)$	$5(x + 2) < 25$
.....
$2x + 1.5 \geq 8.3$	$24.9 \leq 6x + 4.5$
.....
$2x + \frac{3}{2} > \frac{17}{2}$	$4x + \frac{2}{3} > \frac{44}{3}$
.....



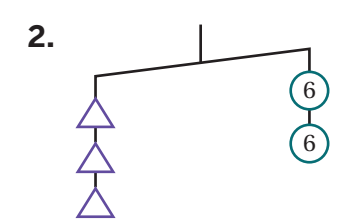
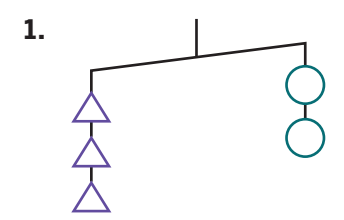
12 Synthesis

Describe a process you can use to determine the solutions to an inequality.

Use the diagram if it helps show your thinking.

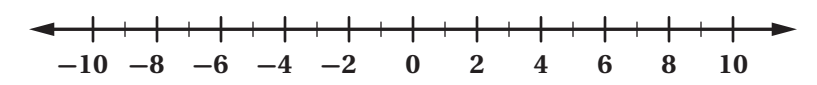


For Problems 1 and 2, use this information. Here is an unbalanced hanger. Write an inequality to represent the relationship between the weights. Use t to represent the weight of the triangle in grams. Use c to represent the weight of the circle in grams.

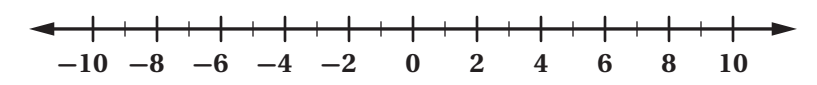


For Problems 3–5, solve each inequality. Use the number line graph to show the solutions for each inequality.

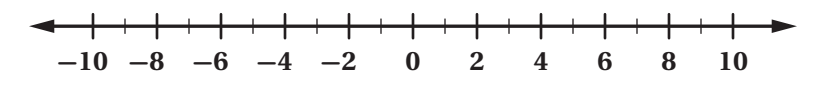
3. $5x \leq 20$



4. $11 > 2x + 1$

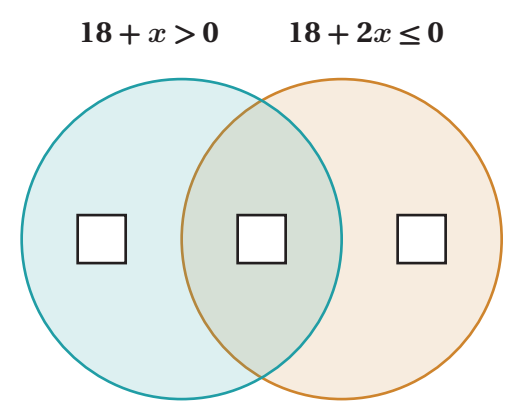


5. $2(x + 3) > 18$



6. List three values for x that would make $5x \leq 20$ true.

7. Write a value in each region that makes the inequality or inequalities true.



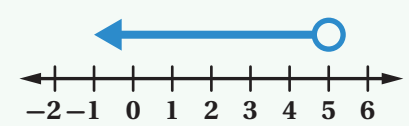
Summary

You can solve an inequality in similar ways that you solve an equation to determine the values of x that make the inequality true. These values are known as the *solutions to an inequality*. You can test values by substituting them into the inequality.

For example, consider the inequality $4x + 2 < 22$.

- To determine the value of x that balances the hanger, solve the equation $4x + 2 = 22$.
- When $x = 5$, the hanger is balanced. All values less than 5 will make the inequality true because $4x + 2$ needs to be less than 22.

The solution shown on the graph means that all values of x less than 5 will make the inequality true.



To check the solution, substitute any value less than 5 into the original inequality.

$$4(4) + 2 < 22$$

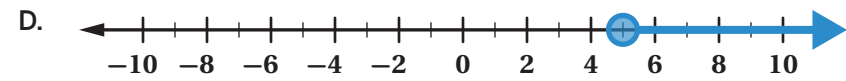
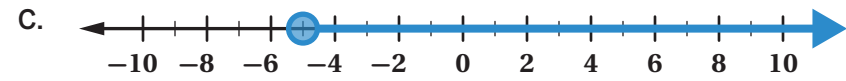
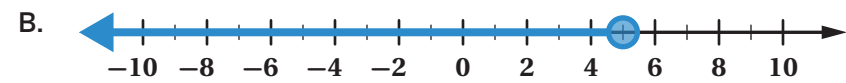
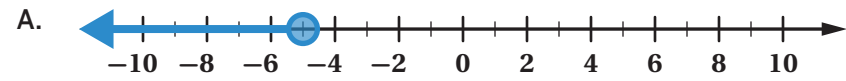
$$16 + 2 < 22$$

$$18 < 22$$

Practice

Name: _____ Date: _____ Period: _____

8. Which number line represents the solutions to the inequality $3x - 8 \leq 7$?



Spiral Review

9. Select *all* of the values that are solutions to $x \leq -4$.

- A. 4 C. -3.99 E. 0
B. -4 D. -4.01

10. Complete the long division to finish writing $\frac{5}{8}$ as a decimal.

$$\begin{array}{r} 0.6 \\ 8 \overline{)5.00} \\ \underline{-48} \end{array}$$

Reflection

- Put a star next to your favorite question.
- Use the space below to ask one question you have or to share something you are proud of.

GRADE 7

Unit 2

Student Lessons

Student lessons from Unit 2 are included here to provide NYC reviewers with access to the specific lessons in Amplify Desmos Math New York that demonstrate coverage of the **Ratios and Proportional Relationships** domain.

These lessons are partially designed and will be updated to match the exemplar Student Edition lessons included earlier in this sampler.

The background features a light purple color palette with various geometric elements: solid lines, dashed lines, squares, diamonds, and circles. Some lines are curved at 90-degree angles. There are also soft, light blue cloud-like shapes scattered across the page. Two horizontal purple lines are positioned above and below the main title text.

Grade 7 Unit 2

Student Edition Sampler



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 1: Notes

Name _____

My Notes

1. What are **equivalent ratios**? Give an example.

2. Brielle mixed 8 cups of blue paint with 6 cups of yellow paint. Complete the table so that each new mixture will match her original paint color.

Blue Cups	Yellow Cups
8	6
4	
	9

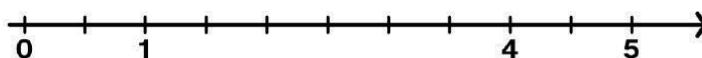
3. Will a mixture with 16 cups of blue paint and 14 cups of yellow paint match the original paint color? Explain your thinking.

Summary

- | |
|---|
| <input type="checkbox"/> I know that two paint mixtures will look the same if the ingredients are in equivalent ratios. |
| <input type="checkbox"/> I can use equivalent ratios to generate the same color paints. |

Warm-Up

Fill in the missing number at every hash mark to complete the diagram.



Practice

Here is a recipe for orangey-pineapple juice, along with four other versions of that recipe.

- Circle **all** of the recipes that taste the same as the original.
- Choose one recipe that you circled.

Explain how you know it tastes the same as the original.

Original Recipe	
<ul style="list-style-type: none"> • 10 cups of orange juice • 15 cups of pineapple juice 	
Recipe 1	Recipe 2
<ul style="list-style-type: none"> • 4 cups of orange juice • 6 cups of pineapple juice 	<ul style="list-style-type: none"> • 3 cups of orange juice • 2 cups of pineapple juice
Recipe 3	Recipe 4
<ul style="list-style-type: none"> • 9 cups of orange juice • 12 cups of pineapple juice 	<ul style="list-style-type: none"> • 6 cups of orange juice • 9 cups of pineapple juice

- Choose one recipe that **does not** taste the same. How does it taste compared to the original?
- To make a mixture that tastes the same as the original recipe, how much pineapple juice should you mix with 1 cup of orange juice?
- Create a different recipe that will also taste the same as the original.



Unit 7.2, Lesson 1: Practice Problems

Explore

Using the digits 1 to 9 as many times as you want, fill in the boxes to create three equivalent ratios.

$$\square:\square = \square\square:\square = \square\square:\square\square$$

Once you have solved it, see if you can find a solution that uses each digit no more than once.

$$\square:\square = \square\square:\square = \square\square:\square\square$$

Reflect

1. Put a star next to the question you are most proud of on this practice worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 2: Notes

Name _____

My Notes

1. What does it mean for two quantities to be in a **proportional relationship**?

2. Complete the tables so that one table shows a proportional relationship and the other does not.

Proportional Relationship		Not a Proportional Relationship	
x	y	x	y
2	8	2	8
6		6	
	4		4

3. Show (or explain) how you know that the table on the left represents a proportional relationship.

Summary

- I can identify patterns in tables that represent proportional relationships.
- I can use a table to calculate unknown quantities in a proportional relationship.



Unit 7.2, Lesson 2: Practice Problems

Name _____

Warm-UpDetermine the value of x that makes each equation true.

$2 \cdot x = 7$

$x =$

$60 \cdot x = 6$

$x =$

$12 \cdot x = 48$

$x =$

$x \cdot \frac{1}{20} = 1$

$x =$

Practice

Complete each table so that the relationship is proportional.

1.1

x	y
30	3
120	
	10

1.2

x	y
1	1.5
3	
	12

1.3

x	y
15	45
1	
	0

1.4

x	y
0.2	1
1	
	20

Entrance to a state park costs \$6 per vehicle, plus \$2 per person.

- 2.1 Complete the table.
- 2.2 How might you determine the entrance cost for a bus with 50 people?
- 2.3 Is the relationship between the number of people and the total entrance cost a **proportional relationship**?

Number of People in Vehicle	Total Cost (dollars)
2	
3	12
4	
10	

Explain how you know.

Unit 7.2, Lesson 2: Practice Problems

A bakery uses 8 tablespoons of honey for every 10 cups of flour to make bread dough. Some days they bake bigger batches, and some days they bake smaller batches.

- 3.1 Complete the table.
- 3.2 Explain how you completed the table.

Honey (tbsp.)	Flour (cups)
8	10
20	
13	
	12.5

Explore

Each row and column contains a sequence of numbers that increase by a constant number (e.g., 4, 8, 12, 16, 20,...).

Fill in the blank boxes.

Reflect

- 1. Put a smiley face next to the question you spent most time on.
- 2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 3: Sugary Drinks

Name(s) _____

Activity 1: Orange Juice

- 1. A 12 -ounce bottle of orange juice contains 33 grams of sugar. Complete the table to determine the amount of sugar in different sizes of orange juice.

Orange Juice		
	Volume (oz.)	Sugar (grams)
Glass	8	
Bottle	12	33
Carton	32	
Jug	128	

- 2. What is the constant of proportionality in this relationship?
- 3. What does the constant of proportionality tell us in this situation?

- 4. If a person wanted to consume exactly 50 grams of sugar from orange juice, how many ounces would they need to drink?

Activity 2: Other Sugary Drinks

- 1. Here is some information about three new beverages. Complete the tables.

Apple Cider		
	Volume (oz.)	Sugar (grams)
Plastic Bottle	8.5	
Large Cup	10	
Glass Bottle	25	31

Carbonated Soda		
	Volume (oz.)	Sugar (grams)
Can	12	
Personal Bottle	20	77
Large Bottle	68	

Energy Drink		
	Volume (oz.)	Sugar (grams)
Mini Can	5	
Regular Can	8	27
Jumbo Can	12	

- 2. Which drink is the most sugary? Explain your thinking.

Unit 7.2, Lesson 3: Sugary Drinks

Name(s) _____

3. Is the relationship between a beverage's volume and its grams of sugar always proportional?

Explain your thinking.

4. This table shows the weight and the amount of sugar of four different candies.

	Weight (grams)	Sugar (grams)
Candy A	48	30
Candy B	44	28
Candy C	57	31
Candy D	52	33

Is this relationship proportional?

If yes, what is the constant of proportionality?

If no, explain why it is not proportional.

Are You Ready for More?

Arjun's goal for this week is to drink no more than 100 grams of sugar from all of his beverages combined. The first table shows Arjun's plan for this week. Try to make a **different** plan to get close to 100 grams of sugar without going over.

Arjun's Planned Beverages	Sugar (grams)
A bottle of orange juice	33
Half a can of carbonated soda	23.1
A regular can of energy drink	27
4 ounces of apple cider	4.96
3 ounces of carbonated soda	11.55
Total:	99.61

Your Planned Beverages	Sugar (grams)
Total:	



Unit 7.2, Lesson 3: Notes

Name _____

My Notes

1. What is a **constant of proportionality**? Give an example.

2. An 8 -ounce glass of apple juice contains 26 grams of sugar. Complete the table to determine the amount of sugar in different sizes of apple juice.

Apple Juice		
	Volume (oz.)	Sugar (grams)
Glass	8	26
Bottle	12	
Carton	32	
Jug	128	

3. What is the constant of proportionality in this relationship? What does it tell us about the situation?

Summary

- I can determine the constant of proportionality from a table and explain what it means.
- I can use the constant of proportionality to calculate unknown information in a table.
- I can justify whether a table represents a proportional relationship or not.

Unit 7.2, Lesson 3: Practice Problems

Name _____

Warm-Up

Circle **all** of the ratios that are equivalent to $4 : 7$.

8 : 15

16 : 28

7 : 4

20 : 35

Practice

When Deven makes chocolate milk, he mixes 2 cups of milk with 3 tablespoons of chocolate syrup. Here is a table that shows how to make batches of different sizes.

- 1.1 Are cups of milk and tablespoons of chocolate syrup in a proportional relationship? Explain how you know.

Milk (cups)	Chocolate Syrup (tbsp.)
2	3
8	12
1	$\frac{3}{2}$
10	15

- 1.2 What is the scale factor from the first row to the second row in the table?

- 1.3 What is a constant of proportionality for this relationship?

Where can you see this constant of proportionality in the table?

When you mix two colors of paint in equivalent ratios, the resulting color is always the same.

- 2.1 Complete the table so that each row makes the same shade of purple. In the last row, make up a new pair of numbers. Explain how you know they will make the same shade of purple.

Blue (cups)	Red (cups)
2	6
1	

- 2.2 What is the constant of proportionality for this relationship? What does it represent?



Unit 7.2, Lesson 3: Practice Problems

Explore

Complete the table below such that a and b represent a proportional relationship.

a	b
0	
1	
	10
$\frac{1}{2}$	
2	

What is the constant of proportionality in this table?

Here is the same table from above. Use a different constant of proportionality to complete this table.

a	b
0	
1	
	10
$\frac{1}{2}$	
2	

What is the constant of proportionality in this table?

Reflect

1. Circle the question that you are least confident about on this practice worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.



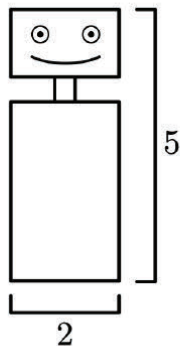
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 4: Notes

Name _____

My Notes

The table shows information about three robots. The relationship between width and height is proportional.



1. Complete the table.

Robot Width in Inches (w)	Robot Height in Inches (h)
2	5
6	
11	

- Write instructions explaining how to calculate the height of the robot given any robot width.
- Write an equation that relates the robot height, h , to the robot width, w .

Summary

- I can explain where to find the constant of proportionality as a value in a table.
- I can write equations to represent proportional relationships.



Unit 7.2, Lesson 4: Practice Problems

Name _____

Warm-Up

Find each quotient.

$640 \div 100$

$640 \div 50$

$640 \div 25$

$64 \div 25$

Practice

Each table represents a proportional relationship. For each table, find the constant of proportionality and write an equation that represents the relationship.

1.1

<i>s</i>	<i>P</i>
2	8
3	12
5	20
10	40

Constant of proportionality:

Equation: $P =$

1.2

<i>d</i>	<i>C</i>
2	6.28
3	9.42
5	15.7
10	31.4

Constant of proportionality:

Equation: $C =$

A plane flew at a constant speed between Denver and Chicago. It took the plane 1.5 hours to fly 915 miles.

2.1 Complete the table.

2.2 How far does the plane fly in one hour?

2.3 How far would the plane fly in t hours at this speed?

2.4 If d represents the distance that the plane flies at this speed for t hours, write an equation that relates d and t .

2.5 How far would the plane fly in 10 hours at this speed? Explain or show your reasoning.

Time (hours)	Distance (miles)
1	
1.5	915
2	
2.5	
t	

Unit 7.2, Lesson 4: Practice Problems

Nathan is planning to ride his bike for 24 minutes.

- 3.1 If he rides at a rate of 3 miles per hour, how far will he travel? 3.2 If he rides at a rate of 5 miles per hour, how far will he travel?
- 3.3 Write an equation that Nathan can use to find d , the distance he will travel in 24 minutes, if his rate in miles per hour is represented by r .

Explore

Here are eight columns. Pair up the columns such that each pair creates a table that represents a proportional relationship. Fill in any blanks.

a	b	c	d	e	f	g	h
0		4	1	1	0		
1	9	8	2	2	1	7	
2	27	12			3	14	
	45	16	6	4		21	
4	90		8	5	10	28	

Use the table below to show your solution and the constant of proportionality for each pair.

Pair		Constant of Proportionality

Reflect

- Circle the question you are most proud of completing.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 5: Notes




Name _____

My Notes

A bakery uses the equation $f = 1.5h$ to decide how many tablespoons of honey, h , to add to f cups of flour for bread.

1. What does the 1.5 mean in this situation?

2. Fill in the missing information for each bread recipe.

		
Honey: 14 tbsp. Flour: 21 cups	Honey: 5 tbsp. Flour: ____ cups	Honey: ____ tbsp. Flour: 18 cups

3. A truck is traveling at a constant speed. Its distance, d , in miles after t hours is represented by the equation $d = 45t$.

How long does it take the truck to travel 18 miles?

Summary

I can connect each part of an equation of the form $y = kx$ to the situation it represents.

I can use an equation to solve problems involving a proportional relationship.

Warm-Up

Here are the second and fourth figures in a pattern. Draw Figures 1 and 3.



Figure 1

Figure 2

Figure 3

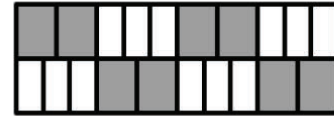


Figure 4

Practice

A performer expects to sell 5 000 tickets for an upcoming concert. They plan to make a total of \$311 000 in sales from these tickets.

- 1.1 Assume that all tickets have the same price. What is the price for one ticket?

- 1.2 How much money will they make if they sell 7 000 tickets?

- 1.3 Write an equation to represent the relationship between the number of tickets sold, x , and the total amount of money (in dollars) that they make, y .

- 1.4 If they make \$379 420, how many tickets have they sold?

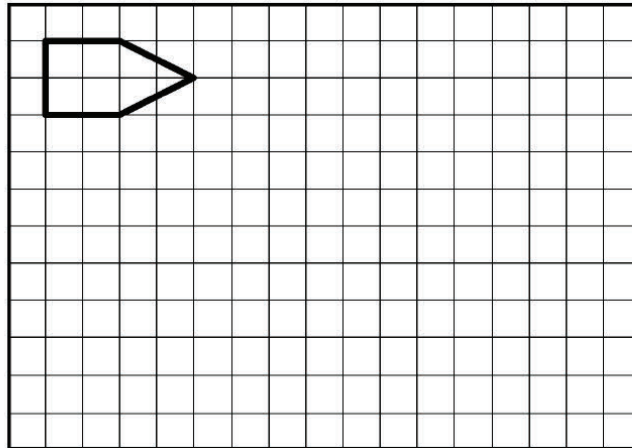
- 1.5 How many tickets will they have to sell to make \$5 000 000 ?



Unit 7.2, Lesson 5: Practice Problems

Here is a polygon on a grid.

- 2.1 Draw a scaled copy of the polygon using a scale factor of 3. Label the copy *A*.
- 2.2 Draw a scaled copy of the polygon with a scale factor $\frac{1}{2}$. Label it *B*.
- 2.3 Is polygon *A* a scaled copy of polygon *B* ?
If so, what is the scale factor that takes *B* to *A* ?



Explore

Here are some facts:

- A cheetah ran 100 meters in 6 seconds.
- A sloth took 15 seconds to move 1 meter.
- A mosquito flew about 5 meters every 9 seconds.
- Usain Bolt ran 6.5 meters per second when he broke the 100-meter dash world record.

Complete the table.

	Speed (meters per second)	Pace (seconds per meter)
Cheetah		
Sloth		
Mosquito		
Usain Bolt		

Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden’s Cooler (Partner A)

It took Jayden 5 minutes to fill a cooler with 8 gallons of water from a faucet that was flowing at a steady rate. Complete the table using this fact.

Time in Minutes (t)	Gallons of Water (w)
0	0
1	
2.5	
5	
t	

1. What is the constant of proportionality?
2. Write an equation for the proportional relationship.

Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden’s Cooler (Partner B)

It took Jayden 5 minutes to fill a cooler with 8 gallons of water from a faucet that was flowing at a steady rate. Complete the table using this fact.

Gallons of Water (w)	Time in Minutes (t)
0	0
1	
4	
8	
w	

1. What is the constant of proportionality?
2. Write an equation for the proportional relationship.



Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner A)

3. What is the relationship between the constants of proportionality that you and your partner found?
 4. What does $\frac{5}{8}$ tell you about the situation?
 5. What does $\frac{8}{5}$ tell you about the situation?
-

Unit 7.2, Lesson 6: Two and Two

Name _____

Activity 1: Jayden's Cooler (Partner B)

3. What is the relationship between the constants of proportionality that you and your partner found?
4. What does $\frac{5}{8}$ tell you about the situation?
5. What does $\frac{8}{5}$ tell you about the situation?

My Notes

It took Jayden 6 minutes to fill a bathtub with 24 gallons of water from a faucet that was flowing at a steady rate.

Time in Minutes (t)	Gallons of Water (w)
0	0
2	8
4	16
6	24

1. What are the two constants of proportionality for this situation?

How are they related?

2. What does each constant of proportionality tell you about this situation?
3. Write two equations that relate w and t in this situation.

Summary

- | |
|--|
| <input type="checkbox"/> I can explain what <i>reciprocal</i> means and how it is related to constants of proportionality. |
| <input type="checkbox"/> I can write two equations for the same proportional relationship. |



Unit 7.2, Lesson 6: Practice Problems

Name _____

Warm-Up

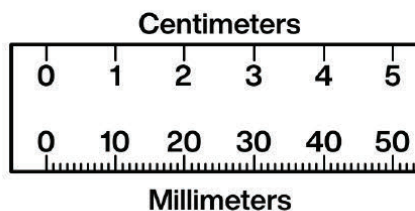
Select all of the scales that are equivalent to the scale 1 cm to 5 km.

- 3 cm to 15 km 1 cm to 150 km 5 cm to 1 km
- 0.5 cm to 2.5 km 12 cm to 60 km

Practice

There is a proportional relationship between any length measured in centimeters (cm) and the same length measured in millimeters (mm).

Use the ruler to help you complete the tables.



1.1 Complete the table.

Length (cm)	Length (mm)
4	
12	
50	
88.49	

What is the constant of proportionality?

1.2 Complete the table.

Length (mm)	Length (cm)
25	
240	
4	
699.1	

What is the constant of proportionality?

1.3 How are these two constants of proportionality related to each other?

2. Amoli and Ella are converting measurements between inches and feet. Amoli says that the constant of proportionality is 12. Ella says it is $\frac{1}{12}$. Do you agree with either of them?

Explain your reasoning.

Unit 7.2, Lesson 6: Practice Problems

3. The area of the Mojave desert is 25 000 square miles. A scale drawing of the Mojave desert has an area of 10 square inches. What is the scale of the map?

Explore

Here is a recipe for 12 cupcakes.

Four friends are deciding where to meet to make the cupcakes.

- Terrance has 1 cup of flour and 6 eggs.
- Duri has 12 cups of flour and 1 000 grams of butter.
- Habib has 3 cups of milk and 6 cups of sugar.
- Anika has 1 cup of sugar and 4 cups of milk.

If each person has enough of all the other ingredients, how many cupcakes could they make on their own?

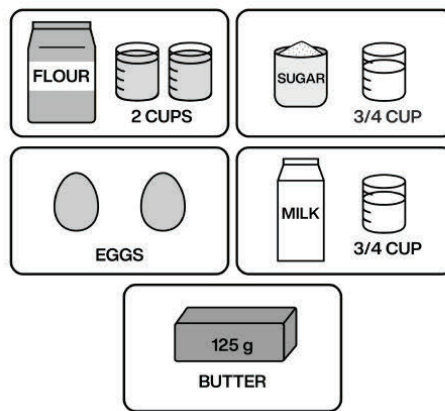
Terrance: _____ cupcakes

Duri: _____ cupcakes

Habib: _____ cupcakes

Anika: _____ cupcakes

They all decide to meet at school, and they each bring their two ingredients. How many cupcakes could they make together?



Reflect

1. Put a star next to the question that you thought was the most important.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 7: Supplement

Name _____

1.a Use the information provided to fill in the missing information.

Story Lucia earns \$12 per hour.	Table	Is it proportional? Explain how you know.										
Equation	<table border="1" style="width: 100%;"> <tr> <th style="width: 50%;">Hours (x)</th> <th style="width: 50%;">Pay (y)</th> </tr> <tr> <td style="text-align: center;">0</td> <td></td> </tr> <tr> <td style="text-align: center;">1</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">30</td> </tr> <tr> <td></td> <td></td> </tr> </table>		Hours (x)	Pay (y)	0		1			30		
	Hours (x)		Pay (y)									
	0											
	1											
	30											

Unit 7.2, Lesson 7: Supplement

Name _____

1.b Use the information provided to fill in the missing information.

Story The recipe calls for 1 banana for every 2 smoothies.	Table	Is it proportional? Explain how you know.										
Equation	<table border="1" style="width: 100%;"> <tr> <th style="width: 50%;">Smoothies (x)</th> <th style="width: 50%;">Bananas (y)</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">2.5</td> </tr> <tr> <td></td> <td></td> </tr> </table>		Smoothies (x)	Bananas (y)	0	0	1			2.5		
	Smoothies (x)		Bananas (y)									
	0		0									
	1											
	2.5											

Unit 7.2, Lesson 7: Supplement

Name _____

2.a Use the information provided to fill in the missing information.

<p>Story</p> <p>The cell phone costs \$500, plus \$35 per month for the plan.</p>	<p>Table</p> <table border="1"> <thead> <tr> <th>Months (x)</th> <th>Total Cost (y)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> </tr> <tr> <td>1</td> <td></td> </tr> <tr> <td></td> <td>605</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Months (x)	Total Cost (y)	0		1			605			<p>Is it proportional?</p> <p>Explain how you know.</p>
Months (x)	Total Cost (y)											
0												
1												
	605											
<p>Equation</p>												

Unit 7.2, Lesson 7: Supplement

Name _____

2.b Use the information provided to fill in the missing information.

<p>Story</p> <p>The area of a square is the side length multiplied by itself.</p>	<p>Table</p> <table border="1"> <thead> <tr> <th>Side Length (x)</th> <th>Area (y)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> </tr> <tr> <td>1</td> <td></td> </tr> <tr> <td></td> <td>100</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Side Length (x)	Area (y)	0		1			100			<p>Is it proportional?</p> <p>Explain how you know.</p>
Side Length (x)	Area (y)											
0												
1												
	100											
<p>Equation</p>												



Unit 7.2, Lesson 7: Notes

Name _____

My Notes

x	y
0	
2	
	27
3.5	

1. Use the equation $y = 2x + 3$ to complete the table.
2. Does the equation represent a proportional relationship?
Explain.

$\frac{x}{2} = y$
$y = 2x + 1$
$y = 1.5x$

3. Circle the equations that represent a proportional relationship.
4. How can you tell if an equation represents a proportional relationship?

Summary

I can explain why a relationship is proportional or not by looking at the equation.

Warm-Up

Find each of the following percentages:

50% of 40

25% of 40

5% of 40

5% of 80

Practice

The relationship between a distance in yards, y , and the same distance in miles, m , is described by the equation $y = 1\,760m$.

- 1.1 Find some measurements in yards and miles by completing the table.
- 1.2 Is the relationship between a measurement in yards and a measurement in miles for the same distance proportional? Explain why or why not.

Distance (mi.)	Distance (yd.)
1	
5	
	3 520
	17 600

2. Select **all** of the equations that represent a proportional relationship.
 - The remaining length, L , of a 120-inch rope after x inches have been cut off: $120 - x = L$.
 - The total cost, t , after an 8% sales tax is added to an item's price, p : $1.08p = t$.
 - The number of marbles each sister gets, x , when m marbles are shared equally among four sisters: $x = \frac{m}{4}$.
 - The volume, V , of a rectangular prism whose height is 12 cm and base is a square with side lengths s cm: $V = 12s^2$.

3. Use the equation $y = \frac{5}{2}x$ to complete the table.
Is y proportional to x ?

x	y
2	
3	
6	

4. Use the equation $s = 3.2r + 5$ to complete the table.
Is s proportional to r ?

r	s
1	
2	
4	



Unit 7.2, Lesson 7: Practice Problems

5. Quadrilateral A has side lengths 3 cm, 4 cm, 5 cm, and 6 cm.

Quadrilateral B is a scaled copy of quadrilateral A with a scale factor of 2.

Select **all** of the possible side lengths of quadrilateral B .

- 5 cm 6 cm 7 cm 8 cm 9 cm

Explore

Liam and Sadia are running a 60-meter race.

Each of their distances can be represented by an equation, where y is distance in meters and x is time in seconds.

Use this information to complete the table:

- Liam's distance is represented with the equation $y = 6x$.
- At 8 seconds, Liam is 16 meters ahead of Sadia.

Time (sec.)	Liam's Distance (m)	Sadia's Distance (m)
0		
2		
4		
6		
8		

What is an equation for Sadia's distance?

How many meters has Sadia run when Liam finishes the race?

Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Practice Day 1: Cards

Name(s) _____

1. Here are three different recipes for cookies.

Recipe 1: Mix 2 cups of chocolate chips with 6 cups of cookie batter.

Recipe 2: Mix 3 cups of chocolate chips with 7 cups of cookie batter.

Recipe 3: Mix 4 cups of chocolate chips with 12 cups of cookie batter.

Which two cookie recipes will make the same cookies?

2. This table shows two ways to mix red paint and white paint to make the same shade of pink.

White Paint (cups)	Red Paint (cups)
4	3
28	21

How many cups of red paint should be added to 1 cup of white paint to make the same shade of pink?

3. Explain how you can tell if a table of values represents a **proportional relationship**.

4. Ashley and Oscar were looking at the proportional relationship in this table.

Ashley says the constant of proportionality is 540.

Oscar says the constant of proportionality is 9.

Do you agree with either of them?

Explain your thinking.

Time	Distance
1 hour	540 miles
1 hour	864 miles
36 minutes	
42 minutes	378 miles



Unit 7.2, Practice Day 1: Cards

Name(s) _____

5. Decide whether this table could represent a proportional relationship.

x	y
5	1.5
8	2.5
30	10

Explain or show your thinking.

6. What is a **constant of proportionality**?

7. Write an equation to represent the proportional relationship between the number of bird houses painted and the number of cans of paint.

Cans of Paint, c	2	5	7	15
Bird Houses Painted, b	6	15	21	45

Use c for cans of paint and b for bird houses painted.

8. Write an equation to represent the proportional relationship between distance traveled and time.

Time, t (minutes)	Distance, d (miles)
1	0.05
8	0.4
20	1

Use d for distance and t for time.

Unit 7.2, Practice Day 1: Cards

Name(s) _____

<p>9. The amount of a certain medication that should be given to a dog is described by the equation $g = 0.2w$, where g is the amount of medication in grams that should be given to a dog that weighs w pounds.</p> <p>How much medication should be given to a dog that weighs 60 pounds?</p>	<p>10. The amount of a certain medication that should be given to a dog is described by the equation $g = 0.2w$, where g is the amount of medication in grams that should be given to a dog that weighs w pounds.</p> <p>If the dog needs 10 grams of the medication, what is its weight?</p>
<p>11. To rent a moving van for a day, a company charges \$10 and an additional \$1 for each mile driven.</p> <p>Is the relationship between the miles driven and the total cost a proportional relationship?</p> <p>Explain how you know.</p>	<p>12. Does the equation $y = \frac{x}{10}$ represent a proportional relationship?</p> <p>Explain your thinking.</p>



Unit 7.2, Practice Day 1: Cards

Name(s) _____

13. Select **all** of the pieces of information that let you know there is definitely a proportional relationship between time and rainfall.

- A. The rain storm lasted for 20 hours.
- B. There are 60 minutes in one hour.
- C. 8.4 inches of rain fell during the storm.
- D. The rain fell at a constant rate of 0.42 inches per hour.
- E. The rainfall could be represented by the equation $y = 0.42x$.

14. A store sells peanuts by the pound. The equation $c = 0.8p$ represents the cost in dollars, c , of a bag of peanuts that weighs p pounds.
How many pounds of peanuts can you buy for \$1.00?

15. Tyrone's car can travel about 30 miles for each gallon of gas.

Using d for distance traveled in miles and g for gallons of gas, write two different equations relating d and g .

16. The relationship between a distance in miles and the same distance in feet is $f = 5280m$.

Find the measurements in miles and feet by copying and completing the table.

Miles (m)	Feet (f)
1	
8	
	13 200
	52 800

Unit 7.2, Practice Day 1: Workspace Sheet

Name _____

Use this worksheet to solve each problem.

1.	2.
3.	4.
5.	6.
7.	8.



Unit 7.2, Practice Day 1: Workspace Sheet

Name _____

9.	10.
11.	12.
13.	14.
15.	16.

Warm-Up

Draw an example that shows both of the concepts below. Label each concept in your example.

- Proportional relationship
- Constant of proportionality

Practice: The Middle of the Story

In this practice set, you will see problems (beginnings) **and** correct solutions (ends). Your task is to explain all of the parts in the middle.

Problem 1

Does this represent a proportional relationship?

If yes, state two constants of proportionality.

If not, change values so that the relationship is proportional, and state a constant of proportionality for the new relationship.

Rice (cups)	Beans (cups)
5	3
10	8
2	1.2

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Solution

No. It is not a proportional relationship.

Rice (cups)	Beans (cups)
5	3
10	8 6
2	1.2

A constant of proportionality is $\frac{3}{5}$ or 0.6.



Unit 7.2, Practice Day 1: Practice Problems

Problem 2

Write an equation to represent the relationship between number of deliveries, d , and time, t .

Number of Deliveries	4	12	14
Time (min.)	9	27	31.5

Then determine how many deliveries you could make in 54 minutes.

Solution

$$t = \frac{9}{4}d$$

You can make 24 deliveries in 54 minutes.

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Reflect

1. If this unit were a story, what would its main characters be? Where do you see them show up in each problem?

2. What is one math concept from this unit that you have improved on since the unit started? Explain what you did to help yourself improve.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

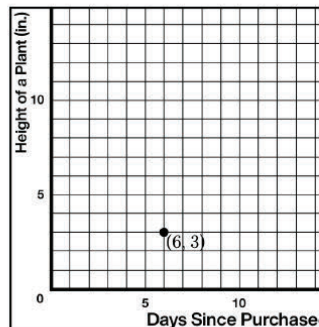
Unit 7.2, Lesson 8: Notes

Name _____

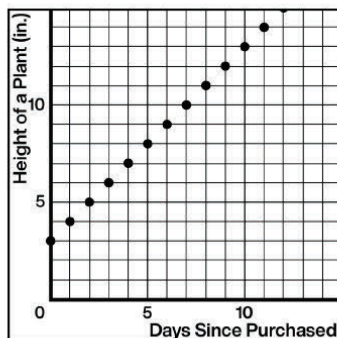
My Notes

A plant's height is proportional to the number of days since it was purchased. On Day 6, it was 3 inches tall.

1. Add more points to the graph to represent the plant's height on other days.



2. Should the origin, $(0, 0)$, be included in this relationship? Why or why not?



3. This graph shows information about a different plant. Does this represent a proportional relationship? Why or why not?

Summary

- I can explain what a proportional relationship looks like when represented with a graph.
- I can justify if a graph represents a proportional relationship or not.

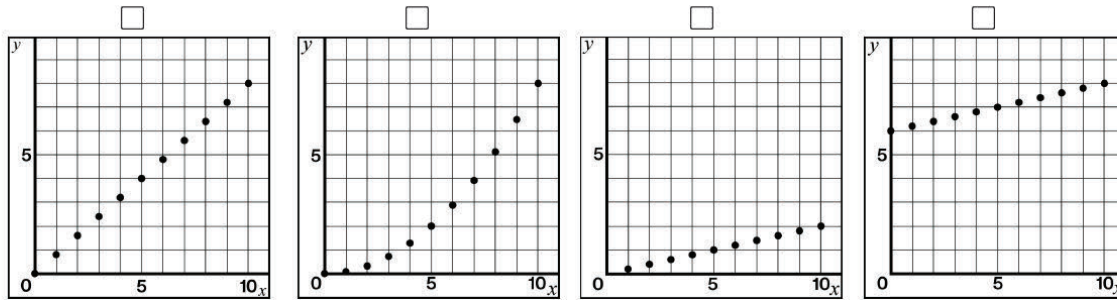


Unit 7.2, Lesson 8: Practice Problems

Name _____

Warm-Up

Select **all** of the graphs that could represent a proportional relationship.



Practice

A lemonade recipe calls for $\frac{1}{4}$ cup of lemon juice for every 1 cup of water. Use the table to answer each question.

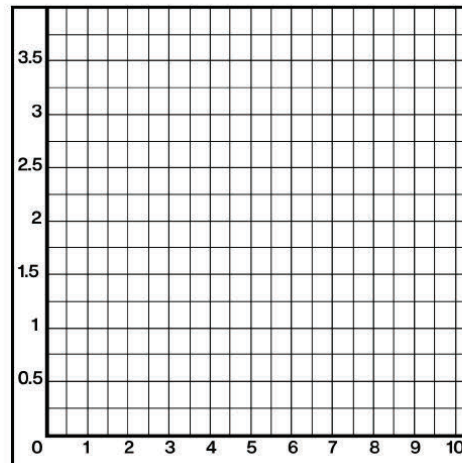
1.1 What does x represent?

1.2 What does y represent?

1.3 Is there a proportional relationship between x and y ?

x	y
1	$\frac{1}{4}$
2	$\frac{1}{2}$
3	$\frac{3}{4}$
4	1
5	$1\frac{1}{4}$
6	$1\frac{1}{2}$

1.4 Use the coordinate plane below to plot the pairs in the table.



2. Arturo earns \$33.00 for babysitting 4 hours. At this rate, how much will he earn if he babysits for 7 hours?

Explain your reasoning.

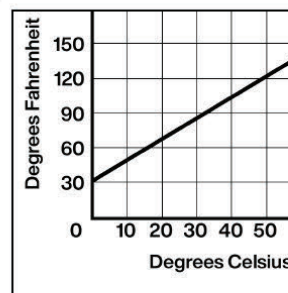
Unit 7.2, Lesson 8: Practice Problems

3. Select **all** of the proportional relationships.

The length and width of scaled copies of a rectangle.

$y = 3x$

x	y
0	1
1	2
2	3
5	6



Explore

For each problem, fill in the blanks to create a proportional relationship. Use the digits 0–9 no more than once in each problem. Use the coordinate plane if it helps you with your thinking.

Problem 1

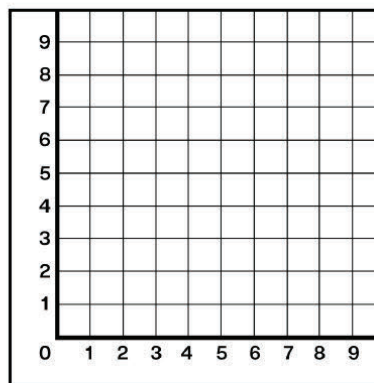
(\square, \square) and (\square, \square)

Problem 2

$(\square, \square), (\square, \square)$ and (\square, \square)

Problem 3

$(\square, \frac{\square}{\square})$ and (\square, \square)



Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



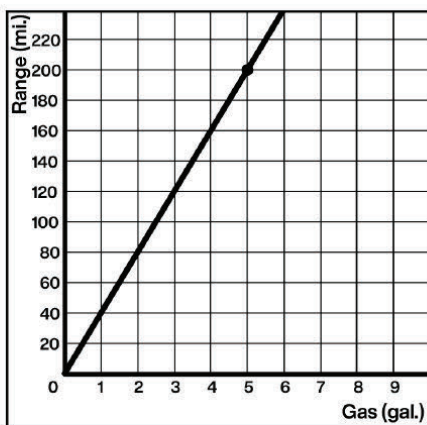
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 9: Notes

Name _____

My Notes

The graph shows how far a car travels using any amount of gas.



1. Determine the constant of proportionality for the relationship between gallons of gas and miles.

2. What does the constant of proportionality mean in this situation?
3. In general, how can you use a graph to find the constant of proportionality for a proportional relationship?

Summary

- I can interpret points on the graph of a proportional relationship.
- I can identify the constant of proportionality from a graph of a proportional relationship.

Unit 7.2, Lesson 9: Practice Problems

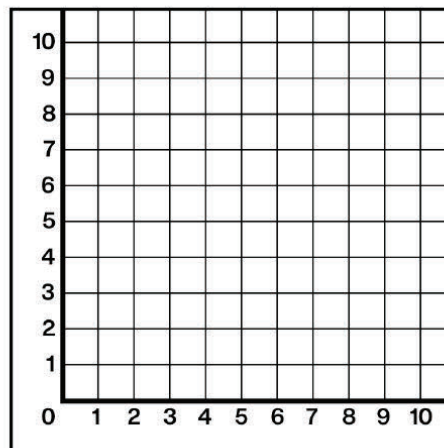
Name _____

Warm-Up

Plot the following points on the coordinate plane:

$(0, 10)$, $(1, 8)$, $(2, 6)$, $(3, 4)$, $(4, 2)$

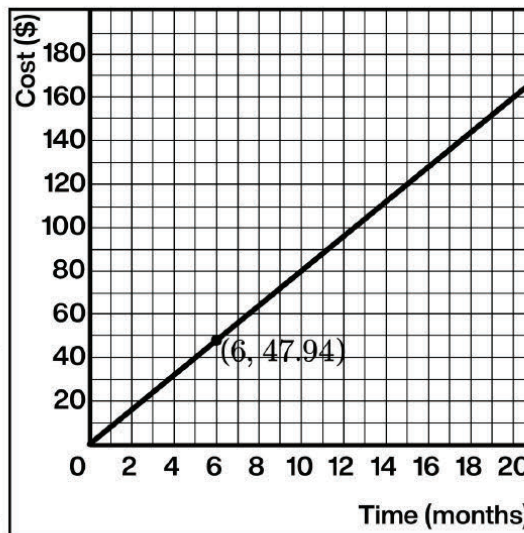
Is this a proportional relationship?



Practice

There is a proportional relationship between the number of months a person has had a streaming service subscription and the total amount of money they have paid for the subscription. After 6 months, a user has paid \$ 47.94 . The point $(6, 47.94)$ is shown in the graph.

- 1.1 What is the constant of proportionality in this relationship?
- 1.2 What does the constant of proportionality mean in this situation?
- 1.3 Label the point $(1, k)$ on the graph. Determine the value of k .
- 1.4 Determine the coordinates of three more points on this line and label them on the graph.
- 1.5 Write an equation that represents the relationship between C , the total cost of the subscription, and m , the number of months.



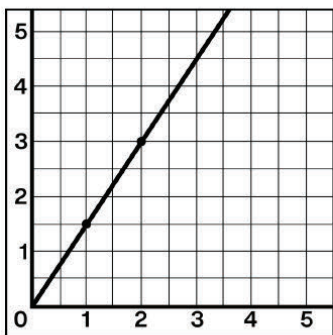


Unit 7.2, Lesson 9: Practice Problems

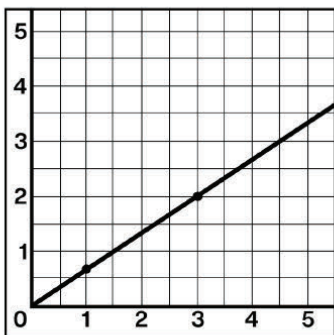
Write an equation for each graph. Choose from the equations listed below.

$y = \frac{2}{3}x$	$y = \frac{4}{3}x$	$y = \frac{3}{2}x$
--------------------	--------------------	--------------------

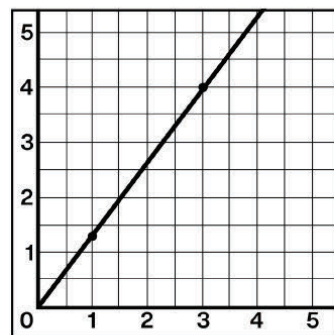
2.1 Equation: _____



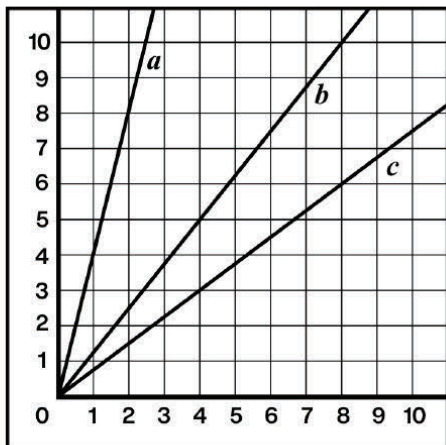
2.2 Equation: _____



2.3 Equation: _____



Explore



Lines a , b , and c represent three different proportional relationships.

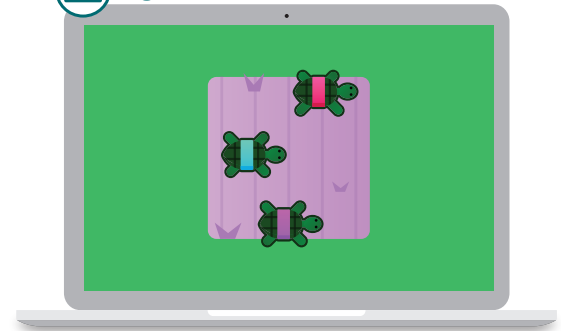
Plot and label two points on each line.

State the constant of proportionality for each proportional relationship in the table below.

Line	Constant of Proportionality
a	
b	
c	

Reflect

- Circle the question you enjoyed doing the most.
- Use the space below to ask one question you have or to share something you are proud of.



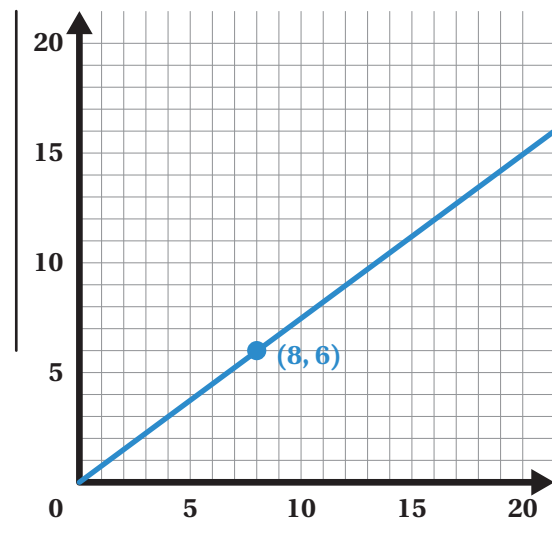
Three Turtles

Let's use graphs and equations to compare proportional relationships.

Warm-Up

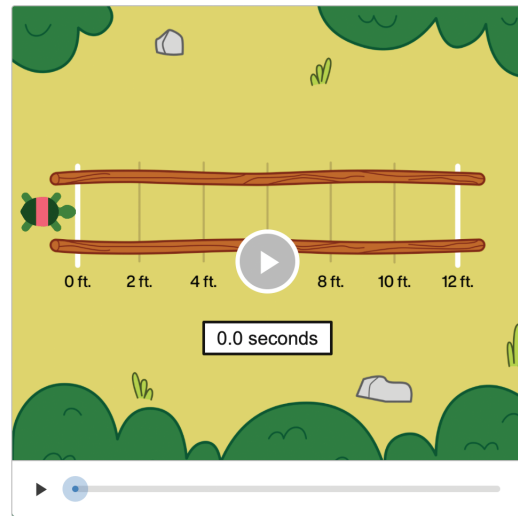
1 Here is a graph that represents a proportional relationship.

a Label the axes with any quantities you'd like.



b Write a true statement about the quantities based on the graph.

2 Let's watch an animation.

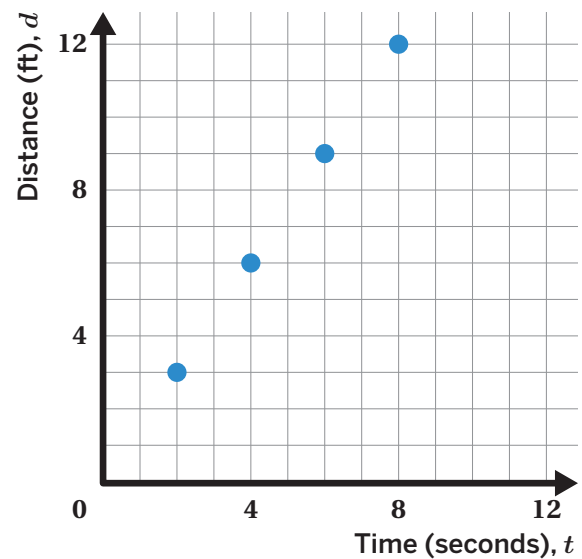


What is a constant of proportionality for this relationship?

Time (sec)	Distance (ft)
2	3
4	6
6	9
8	12

3 The points from the table are plotted on the graph.

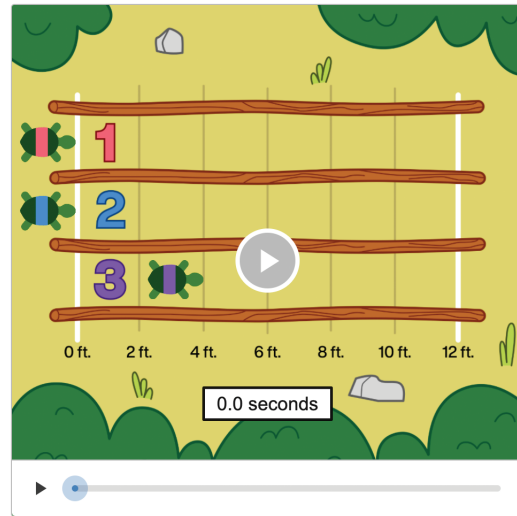
Write an equation for this relationship.
Use d for distance and t for time.



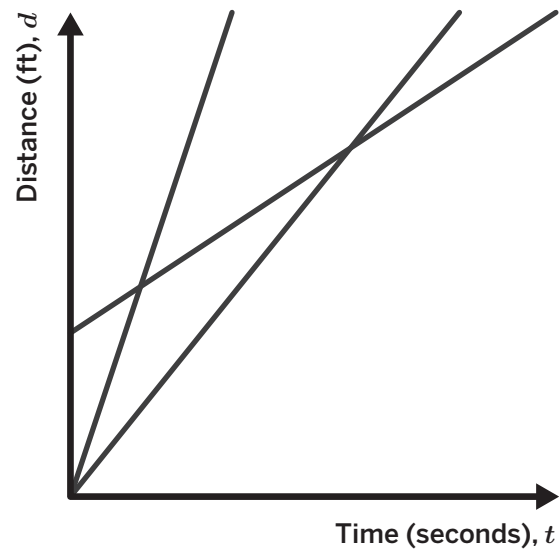
Name: _____ Date: _____ Period: _____

Three Turtles

4 Let's watch another animation.



Match each turtle to the line that represents it.



5 Decide whether each turtle's distance-time relationship is proportional.

Turtle	Is the relationship proportional?
--------	-----------------------------------

Turtle 1 $d = 3t$
-------------------	-------

Turtle 2 $d = \frac{2}{3}t + 4$
---------------------------------	-------

Turtle 3 $d = 1.25t$
----------------------	-------

Explain your thinking.

Activity
2

Three Turtles (continued)

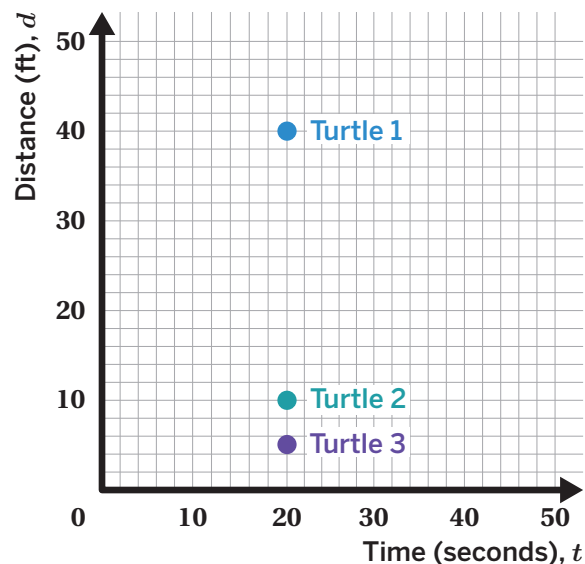
6 Here are three new turtles and their distances at 20 seconds.

- Turtle 1 is 40 feet from the start.
- Turtle 2 is 10 feet from the start.
- Turtle 3 is 5 feet from the start.

These are all proportional relationships.

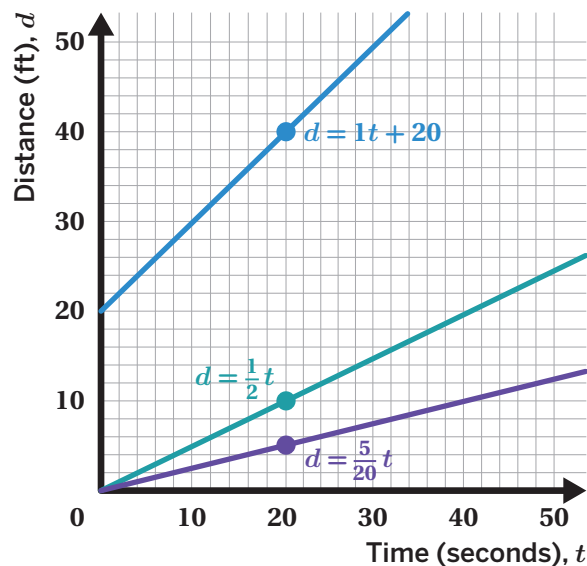
Write an equation for each turtle using d for distance and t for time. One has been done for you.

Turtle	Equation
Turtle 1	
Turtle 2	$d = \frac{1}{2}t$
Turtle 3	



7 Here are three distance-time relationships.

- a** Which of these relationships is *not* proportional? Explain your thinking.
- b** What does the point $(0, 20)$ mean for the turtle with the graph that includes this point?



8 **Card Sort:** You will use a set of cards. Sort them into three groups that each represent the same turtle.

Group 1	Group 2	Group 3

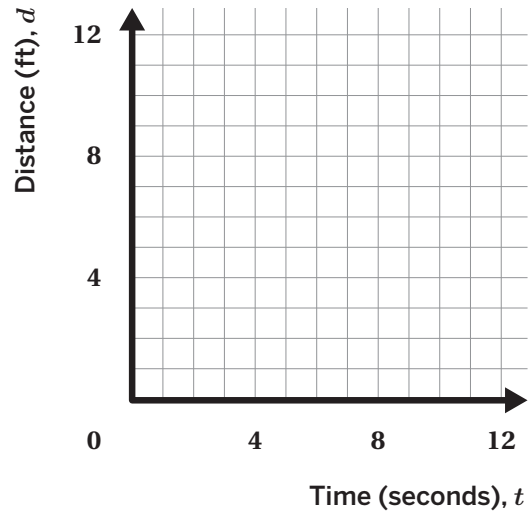
Name: _____ Date: _____ Period: _____

Turtle Tomfoolery

9 Create your own 12-foot turtle race by drawing a line for each of the three turtles.

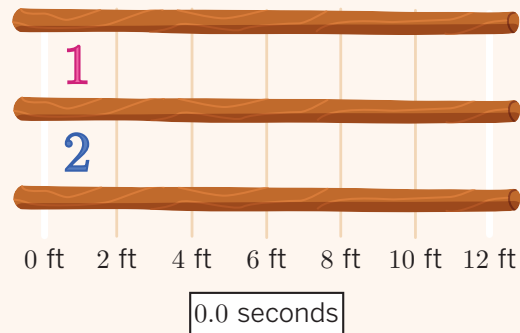
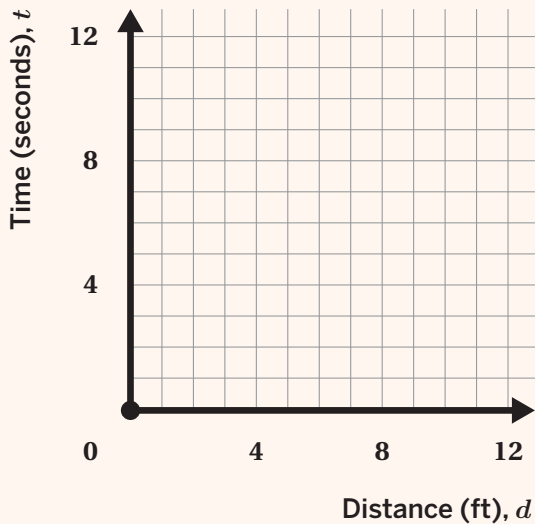
Can you make a turtle that . . .

- Stays still?
- Goes backward?
- Finishes at the same time as another turtle?



You're invited to explore more.

10 Draw lines representing the turtles so that Turtle 1 is faster than Turtle 2. Take note of the axis labels on the graph.



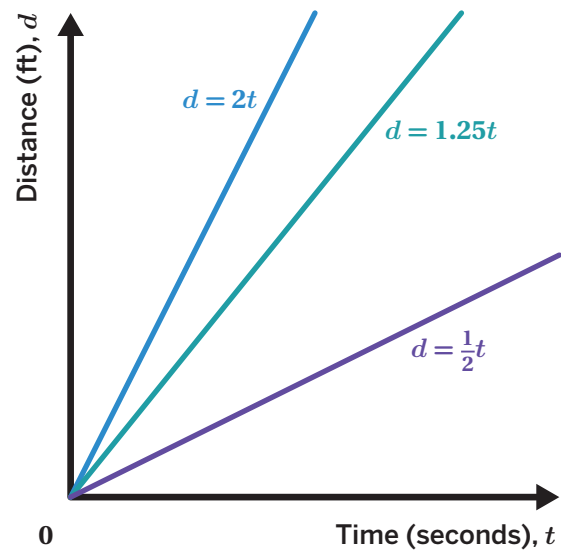
STOP

11 Synthesis

This graph shows the distance traveled over time by three different turtles.

Discuss the following questions. Then select one question and record your response.

1. How can you tell from the graphs which turtle moved the fastest?



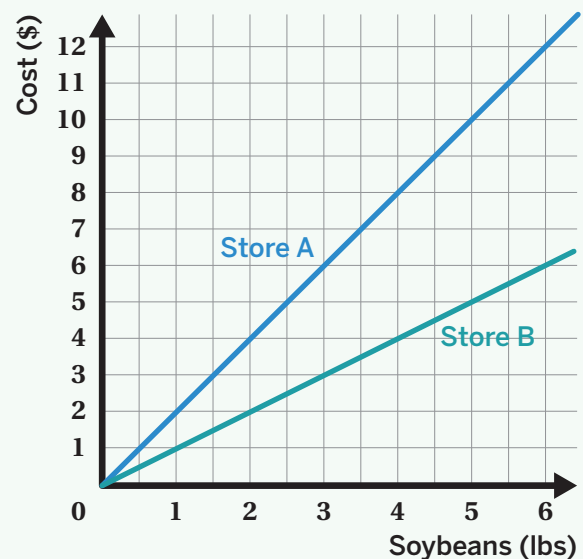
2. How can you tell from the equations which turtle moved the fastest?

Summary

Graphs of proportional relationships can be compared when on the same coordinate plane. The steeper the line, the greater the constant of proportionality.

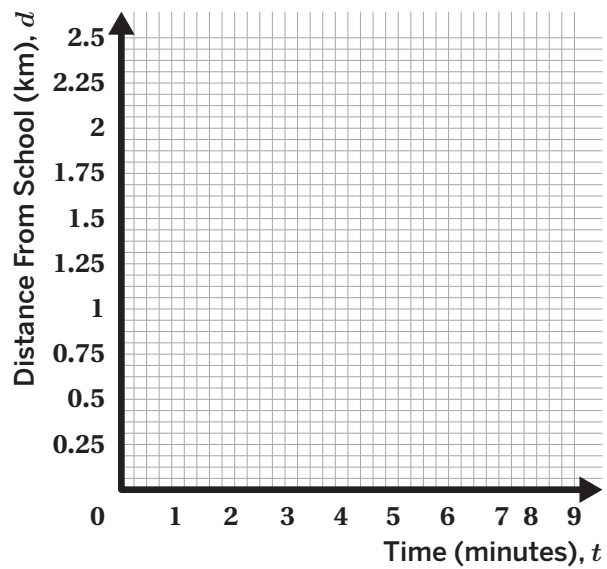
For example, this graph shows the cost of soybeans at two different stores.

- On the graph, the line representing Store A is steeper than the line representing Store B, so it has a greater constant of proportionality.
- In context, this means Store A charges more per pound than Store B because its line is steeper.
- Store A charges \$2 per pound, while Store B charges \$1 per pound. The constant of proportionality of Store A is greater than that of Store B.



For Problems 1–4, use this information. Mia and Jamal bike home from school at a steady pace. Mia bikes 1.25 kilometers and it takes her 4 minutes. Jamal bikes 1.75 kilometers and it takes him 7 minutes.

1. Create two lines that represent Mia and Jamal’s journeys.
2. Plot a point on each line when $t = 1$.
3. Determine each value of r , the constant of proportionality.



Line	r
Mia	
Jamal	

4. Who bikes faster? Explain your thinking.

5. The point $(3, \frac{6}{5})$ lies on a graph representing a proportional relationship. Select *all* of the points that also lie on the same graph.

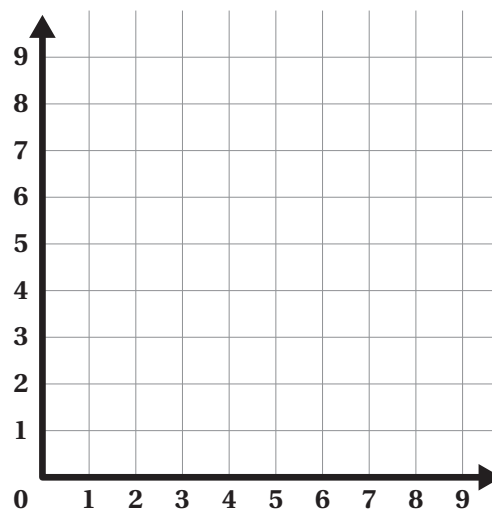
A. $(1, 0.4)$	D. $(4, \frac{11}{5})$
B. $(1.5, \frac{6}{10})$	E. $(15, 6)$
C. $(\frac{6}{5}, 3)$	

Practice

Name: _____ Date: _____ Period: _____

For Problems 6–9, use this information. At a supermarket, you can fill your own honey container and pay by the ounce. A customer buys 12 ounces of honey for \$5.40.

- How much does the honey cost per ounce?
- How much honey can you buy for \$1 dollar?
- Write two different equations that represent this situation. Use h for ounces of honey and c for cost in dollars.
- Graph the line of one of your equations from the previous screen. Be sure to label the axes.



Spiral Review

For Problems 10–13, match each equation with its graph.

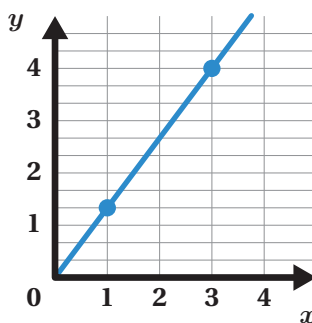
10. $y = \frac{1}{4}x$

11. $y = \frac{3}{2}x$

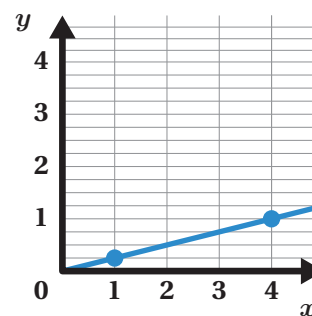
12. $y = 2x$

13. $y = \frac{4}{3}x$

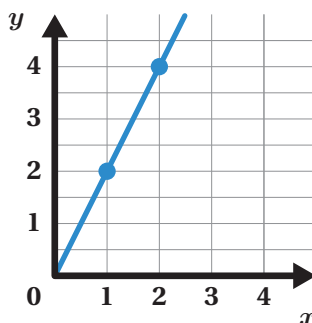
Graph 1



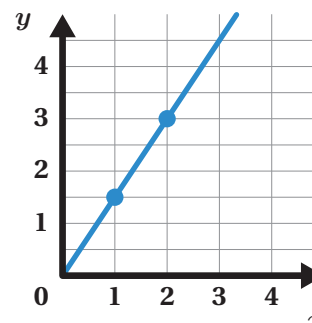
Graph 2



Graph 3



Graph 4



Reflection

- Put a smiley face next to a question you were stuck on and then figured out.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 11: Four Representations

Name(s) _____

Activity 1: Stronger and Clearer Each Time

Select two items from different lists.

Then create and describe a proportional relationship between quantities that involve these items.

First Draft	
Conversation Notes #1	Conversation Notes #2
Final Version	



Unit 7.2, Lesson 11: Four Representations

Name(s) _____

Activity 2: Four Representations

The two quantities are:

Description
Describe the relationship in one or more complete sentences.

Table of Values

Graph
Label each axis.

Equation
Write the equation here.

Explain the equation in words.

Explain how you know whether a relationship is proportional or not proportional.

My Notes

1. Create a table, an equation, and a graph of this proportional relationship.

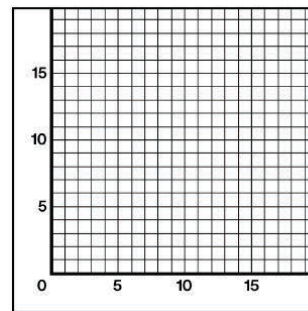
Description

A bakery uses 7 scoops of chocolate for every 2 cups of milk to make chocolate milk.

Equation

Table

Graph



2. Circle or show where you can see the constant of proportionality in each representation.

Summary

I can create four different representations of a proportional relationship (description, table, graph, equation).



Unit 7.2, Lesson 11: Practice Problems

Name _____

Warm-Up

Find each product or quotient.

$$\frac{2}{3} \cdot \frac{1}{2}$$

$$\frac{4}{3} \cdot \frac{1}{4}$$

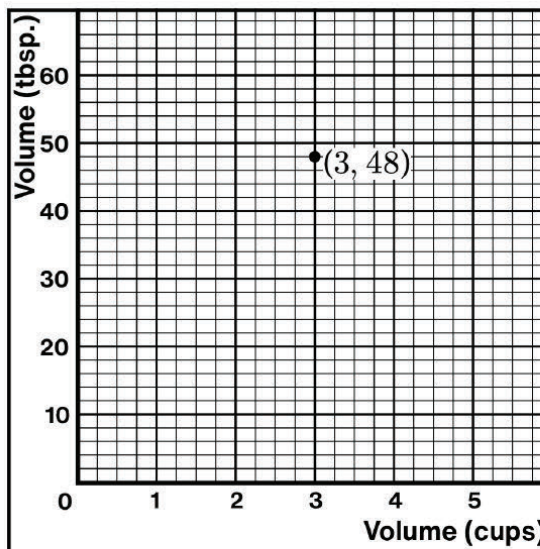
$$4 \div \frac{1}{5}$$

$$\frac{9}{6} \div \frac{1}{2}$$

Practice

There is a proportional relationship between a volume measured in cups and the same volume measured in tablespoons. 3 cups is equivalent to 48 tablespoons, as plotted in the graph.

- 1.1 Plot and label at least two more points that represent the relationship.
- 1.2 Use a straightedge to draw a line that represents this proportional relationship.
- 1.3 For which value y is $(1, y)$ on the line you just drew?
- 1.4 What is a constant of proportionality for this relationship?
- 1.5 Write an equation representing this relationship. Use c for cups and t for tablespoons.



2. The high-speed rail supports trains that can travel at constant speeds. An equation relating the distance traveled in miles, d , to the number of hours traveled, t , is $t = \frac{1}{150} d$.

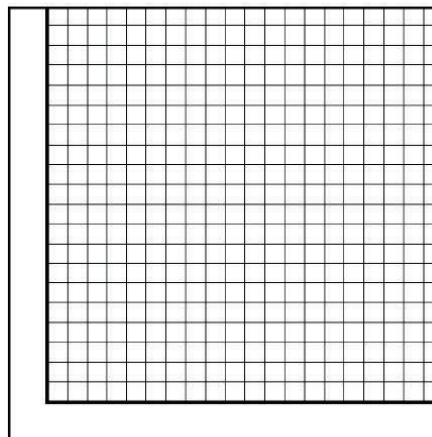
How long will it take the high-speed train to travel 900 miles?

Unit 7.2, Lesson 11: Practice Problems

The equation $c = 2.95g$ shows the cost in dollars, c , to buy g gallons of gas at a gas station.

3.1 Write at least four pairs that fit this relationship: (gallons of gas, cost) .

3.2 Create a graph of the relationship.

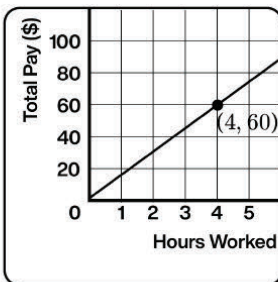


3.3 What does 2.95 represent in this situation?

Explore

Here are three cards. Two of them represent the same relationship and one is different. Which one represents a different relationship than the others?

Lucia has to work 12 hours in a week to earn \$180.



Hours Worked	Total Pay (\$)
0	0
2	25
6	75
10	125
20	250

What is an equation that represents Lucia’s total pay per hour? Use h for hours worked and p for total pay.

Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.2, Lesson 12: Water Efficiency

Name(s) _____

Warm-Up

What question are you trying to answer?

What is your best guess?

What information do you need to answer the question?

Make estimates for the information above, including the units. A range of numbers is okay.

Activity 1: Bath vs. Shower

1. Decide on specific numbers you want to use for this problem. List these assumptions below.

2. State your answer to the question. Use this space for calculations.

Unit 7.2, Lesson 12: Water Efficiency

Name(s) _____

3. What could you change in order to make the opposite answer true?

Create a poster. Here is what your group's poster should include:

- Your group's answer to the question: *Under what conditions does a bath use more water than a shower?*
- Your group's answer to the question: *Under what conditions does a shower use more water than a bath?*
- Explanations that show your group's reasoning for the answers.
- At least one mathematical representation of a proportional relationship:
 - Graph
 - Equation
 - Table

Are You Ready for More?

Kala and Luca are considering upgrading their shower heads to use less water.

- Kala's current shower can fill a 1-gallon jug in 10 seconds. She is considering upgrading to a shower that fills the jug in 30 seconds.
- Luca's current shower can fill a 1-gallon jug in 5 seconds. He is considering upgrading to a shower that fills the jug in 10 seconds.

Whose upgrade will save more water: Kala's or Luca's? Show how you know.

Activity 1: Synthesis

1. Which representation did you find most useful for answering the question?	2. What assumptions did you make to help you answer the question?
--	---



Unit 7.2, Lesson 12: Water Efficiency

Name(s) _____

Activity 2: Gallery Tour

<p>What features of your classmates' posters helped you understand their thinking?</p>	<p>Describe something you would change about your poster now that you have seen other groups' work.</p>
--	---

Activity 3: Revisions and Reflection

1. Use your thinking from the Gallery Tour to make your poster stronger and clearer.
2. Add at least one additional representation to your poster (graph, equation, table).
3. Individually, answer the questions below.

<p>What did you learn about water usage that was surprising or new?</p>	<p>What are some changes a person could make to save water?</p>
---	---

My Notes

Information about the fuel usage of two cars is shown below.

Car A	Car B
20 gallon tank	12 gallon tank
24.9 miles per gallon	552 miles per tank

1. Which vehicle can go farther on 1 gallon of gas?

2. Which vehicle can go farther on a full tank of gas?

Summary

- I can model a real-world situation by deciding what information is important and making assumptions.
- I can use proportional relationships to answer a question about a real-world situation.



Unit 7.2, Lesson 12: Practice Problems

Name _____

Warm-Up

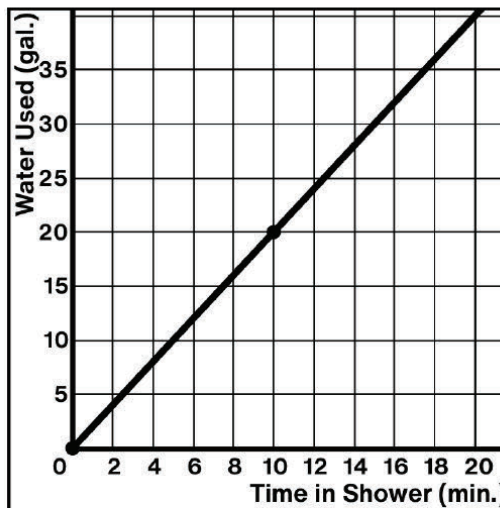
Select all of the equations that represent a proportional relationship.

- $y = 2x + 1$
 $C = 3.14d$
 $\frac{10}{w} = h$
 $\frac{d}{2} = r$
 $p = 4s$

Practice

Here is a graph of water used, w , in gallons and time in the shower, t , in minutes.

- 1.1 Explain how you know these quantities are in a proportional relationship.
- 1.2 What are two constants of proportionality for the proportional relationship?
- What do they each mean in this situation?

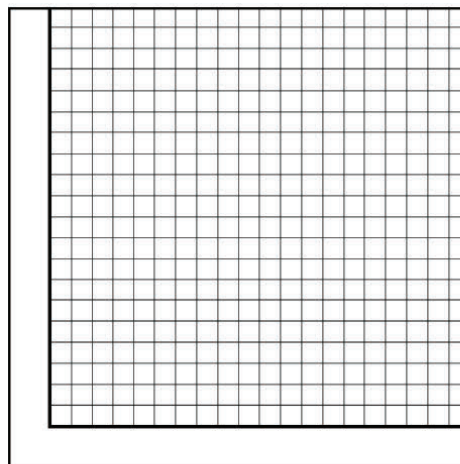


- 1.3 Write two equations for this relationship.
2. A map of a rectangular park has a length of 4 inches and a width of 6 inches. It uses a scale of 1 inch for every 20 miles. What is the actual area of the park? Show how you know.

Unit 7.2, Lesson 12: Practice Problems

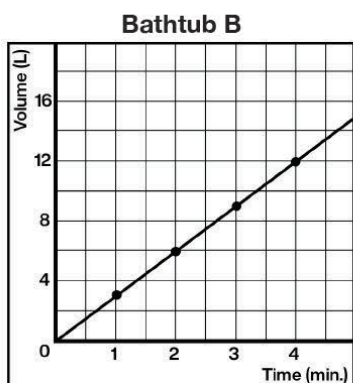
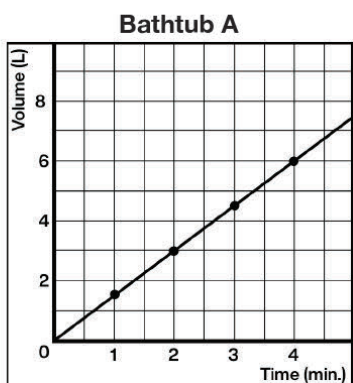
Elena goes to a store where you can scoop your own popcorn and pay by the ounce. She buys 10 ounces of spicy popcorn for \$2.50.

- 3.1 How much does the popcorn cost per ounce? 3.4 Choose one of your equations and sketch its graph. Be sure to label the axes.
- 3.2 How much popcorn can you buy per dollar?
- 3.3 Write two different equations that represent this situation. Use p for ounces of popcorn and c for cost in dollars.



Explore

The graphs represent the volume of water in two bathtubs over time. Which bathtub is filling up faster?



Explain your thinking.

Bathtub C is filling up at a rate of 1 liter per minute.

Sketch a line to represent this bathtub's volume over time on each coordinate plane.

Reflect

- Circle the question you feel most confident about.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

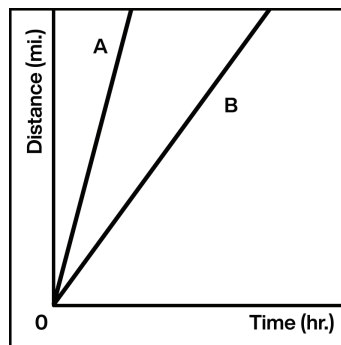
Unit 7.2, Practice Day 2: Cards

Name _____

Comparing Relationships

The graph shows the distance two satellites travel over time as they orbit Mars.

1.1 Which line represents the satellite that is traveling faster?



1.2 Draw a third line on the graph. Describe what that line might represent.

A store sells a 3-pack of markers for \$3.15 and a 5-pack of markers for \$5.40.

2.1 Which pack of markers is a better deal? Show or explain your thinking.

2.2 What do you think the cost of a pack of 10 markers should be? Explain your thinking.

A factory has two machines that make lollipops.

Machine A

Time (min.), m	Number of Lollipops, L
3	30
5	50
	75

Machine B

Time (min.), m	Number of Lollipops, L
2	16
4	
10	80

3.1 Complete each table.

3.2 Which machine will produce more lollipops in 60 minutes?

Equations

1. Match each situation with an equation. You will have one card left over.

H.
A farmer is planting strawberry plants. She can plant 5 plants every 3 feet. Let y represent the number of plants, and x represent the number of feet.
I.
A tomato rice soup recipe calls for 6 pounds of tomatoes for every 2 cups of rice. Let y represent the number of pounds of tomatoes, and x represent the number of cups of rice.
J.
At a market, 6 pounds of potatoes cost \$3. Let y represent the total cost, and x represent the number of pounds of potatoes.

K.
$y = 0.60x$
L.
$y = 3x$
M.
$y = \frac{5}{3}x$
N.
$y = 0.5x$

2. Write a situation to describe the extra card. Be sure to specify what x and y represent.
3. Each ride at an amusement park requires 7 tickets.
Write an equation to describe the relationship between rides and tickets.
Use t for the number of tickets and r for the number of rides.
4. A smoothie recipe calls for 2 tablespoons of honey for every 8 ounces of yogurt.
Which equation could represent the relationship between the number of tablespoons of honey, h , and the number of ounces of yogurt, y ?
- A. $y = 4h$
 B. $y = \frac{1}{4}h$
 C. $y = h + 4$
 D. $h = 4y$



Unit 7.2, Practice Day 2: Cards

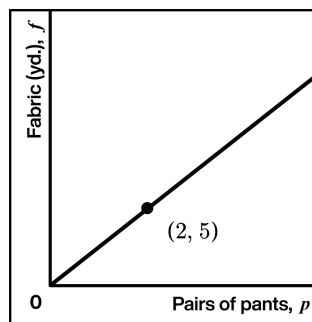
Name _____

Two Truths and a Lie

The graph shows the amount of fabric in yards, f , a designer needs to make p pairs of pants.

1.1 Which statement about this relationship is a lie?

- A. 1 pair of pants would require 2.5 yards of fabric.
- B. The line goes through the point (5, 8).
- C. 15 yards of fabric could make 6 pairs of pants.



1.2 Explain how you know that statement is a lie.

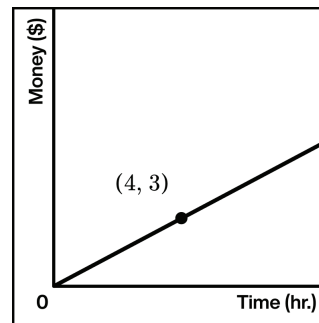
A farmer bought 45 strawberry plants for \$18.

2.1 Which statement about this relationship is a lie?

- A. The equation $C = 0.40p$ represents the cost, C , of p plants.
- B. A constant of proportionality in this relationship is $\frac{2}{5}$.
- C. You could buy 60 plants for \$22 at the same rate.

2.2 Explain how you know that statement is a lie.

3. Create your own two truths and a lie about this graph. When you're done, trade with a classmate.



Matching Representations

1. Match each graph and table.

A.

x	y
0	0
5	7.5
10	15

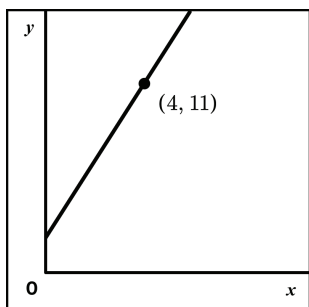
B.

x	y
0	0
1	3
5	15

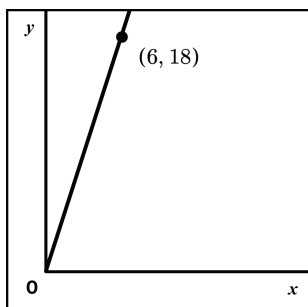
C.

x	y
0	3
1	5
2	7

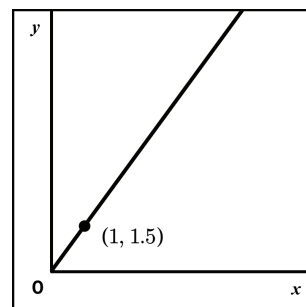
D.



E.



F.



2. Choose one pair. Write an equation that represents the graph and table.

3. Which relationships are proportional? Explain how you know.

Reflect

How can you find the constant of proportionality in a:

- Table?
- Graph?
- Equation?



Unit 7.2, Practice Day 2: Workspace Sheet

Name _____

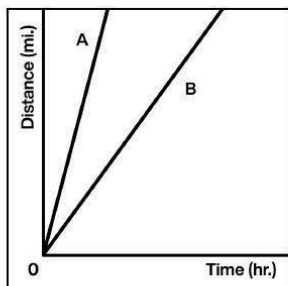
Comparing Relationships

1.1 Circle one: A or B

2.1 Circle one: 3-pack or 5-pack

1.2

2.2



3.1

Machine A

Time (min.), m	Number of Lollipops, L
3	30
5	50
	75

Machine B

Time (min.), m	Number of Lollipops, L
2	16
4	
10	80

3.2

Equations

1. Pair #1: _____ Pair #2: _____ Pair #3: _____

2.

3.

4.

Two Truths and a Lie

1.1 Which is a lie? _____
1.2

2.1 Which is a lie? _____
2.2

3. A: _____

B: _____

C: _____

Matching Representations

1. Pair #1: _____ Pair #2: _____ Pair #3: _____

2. Pair: _____

Equation: _____

3.

Reflect

Table:

Graph:

Equation:

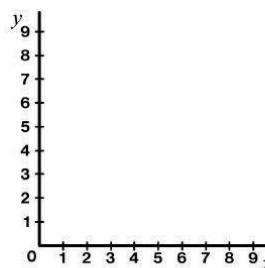


Unit 7.2, Practice Day 2: Practice Problems

Name _____

Warm-Up

1. Draw a graph that has two proportional relationships on it.
2. Draw an arrow to the relationship that has the larger constant of proportionality.



Practice: The Middle of the Story

In this practice set, you will see problems (beginnings) **and** correct solutions (ends). Your task is to explain all of the parts in the middle.

Problem 1

- 1.1 Complete the table so that there is a proportional relationship between the flour and water used to make pizza dough.
- 1.2 Write an equation for the relationship between the amount of flour, f , and the amount of water, w , in pizza dough.

Flour (kg)	Water (liters)
5	
1	0.7
0.4	

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Solutions

1.1

Flour (kg)	Water (liters)
5	3.5
1	0.7
0.4	0.28

1.2 $w = 0.7f$

Unit 7.2, Practice Day 2: Practice Problems

Problem 2

To make a model volcano erupt, you can use 4 tablespoons of baking soda for every cup of vinegar.

Select **all** of the equations that represent the relationship between the tablespoons of baking soda, s , and the cups of vinegar v .

$v = 4s$

$s = 4v$

$v = \frac{1}{4}s$

$s = \frac{1}{4}v$

$s = 4 + v$

Solution

✓ $s = 4v$

✓ $v = \frac{1}{4}s$

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Reflect

1. Name one strategy in this unit that you found particularly useful, and explain why it was useful to you. Also, if you learned it from another student, give that student credit.

2. Write 1–2 big ideas from this unit that you think are important to understand.

GRADE 7

Unit 4

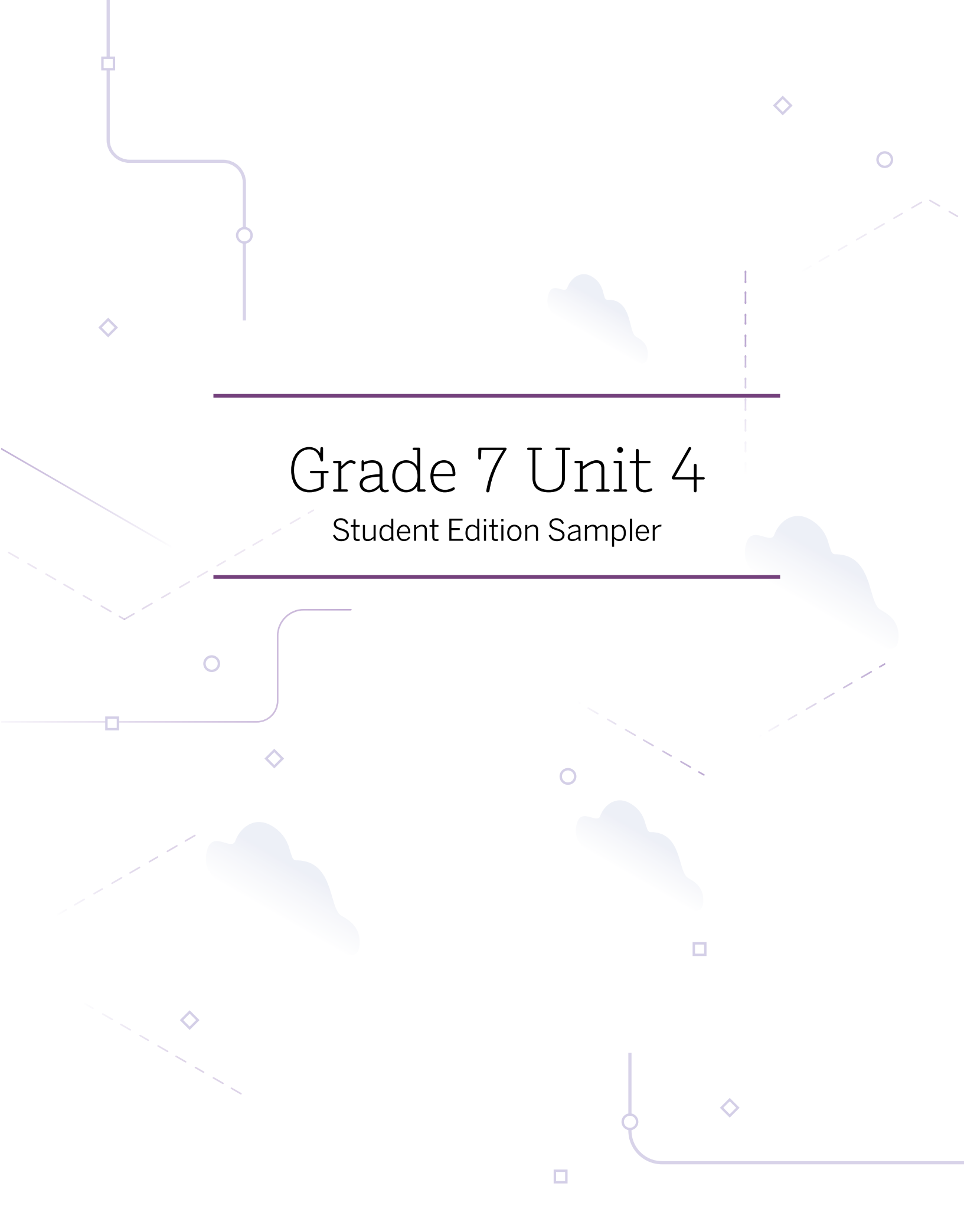
Student Lessons

Student lessons from Unit 4 are included here to provide NYC reviewers with access to the specific lessons in Amplify Desmos Math New York that demonstrate coverage of the **Ratios and Proportional Relationships** domain.

These lessons are partially designed and will be updated to match the exemplar Student Edition lessons included earlier in this sampler.

Grade 7 Unit 4

Student Edition Sampler





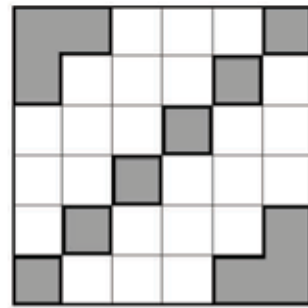
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 1: Notes

Name _____

My Notes

1. What percent of the square is shaded? Explain how you know.



2. Describe a strategy to calculate 15% of 60.
3. Mariam looked at a diagram and said that 30% was shaded and 40% was not shaded. Explain how you know there must be an error.

Summary

- I can visualize a percentage on a grid.
- I can calculate the percentage of a number.

Unit 7.4, Lesson 1: Practice Problems

Name _____

Warm-Up

How do you find 50% of a number quickly in your head?

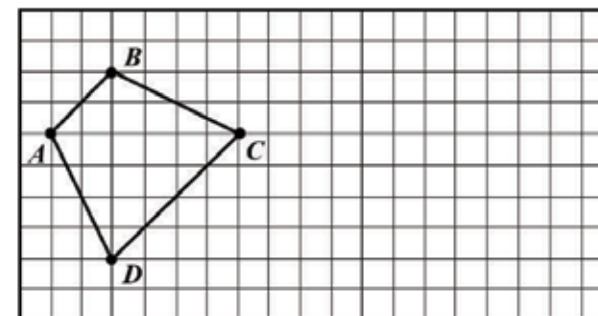
Practice

- | | | |
|---------------------------|--------------------------|--------------------------|
| 1.1 | 1.2 | 1.3 |
| 15 is what percent of 30? | 3 is what percent of 12? | 6 is what percent of 10? |

2. A rectangle measures 2 units by 7 units. A second rectangle measures 11 units by 37 units. Are these two figures scaled copies of one another? If so, find the scale factor. If not, briefly explain why.
3. Ants have 6 legs. Katie and Lukas write equations showing the proportional relationship between the number of ants, a , and the number of ant legs, l . Katie writes $a = 6 \cdot l$ and Lukas writes $a = \frac{1}{6} \cdot l$.

Do you agree with either of the equations? Explain your thinking.

4. On the grid, draw a scaled copy of quadrilateral $ABCD$ with a scale factor of $\frac{1}{2}$.



**Unit 7.4, Lesson 1: Practice Problems**

Jalen has a scale model of a train. 2 centimeters in the model represents 3 feet in a real train.

- 5.1 The height of the model train is 10.2 centimeters. What is the height of the real train?

Explain your thinking.

- 5.2 On the scale model, the wheels of Jalen's train are 3.5 centimeters apart. There are some old railroad tracks in Wyoming that are 4.5 feet apart. Would the real train be able travel on those tracks? Explain your thinking.

Explore

Using the digits 0 to 9 no more than once each, fill in the boxes to create a correct sentence. Use the space below to record your thinking as you experiment.

$$\boxed{}\% \text{ of } \boxed{}\boxed{}\boxed{} = \boxed{}\boxed{}$$

Reflect

1. Draw a star next to your favorite question on this practice worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.

Unit 7.4, Lesson 2: Peach Cobbler

Name(s) _____

Activity 1: Which Recipe?

Amara is making peach cobbler. She has three recipes and is deciding which one to make.

Recipe A	Recipe B	Recipe C
Number of Servings: 9	Number of Servings: 12	Number of Servings: $4\frac{1}{2}$
<ul style="list-style-type: none"> • $2\frac{7}{10}$ lb. of peaches • $\frac{1}{2}$ cup of butter • 1 cup of flour • $1\frac{1}{8}$ cups of sugar • $\frac{1}{2}$ tsp. of lemon juice 	<ul style="list-style-type: none"> • 4 lb. of peaches • $\frac{3}{4}$ cup of butter • $\frac{3}{4}$ cup of flour • $1\frac{1}{3}$ cups of sugar • $\frac{1}{2}$ tsp. of lemon juice 	<ul style="list-style-type: none"> • $1\frac{4}{5}$ lb. of peaches • $\frac{1}{4}$ cup of butter • $\frac{2}{3}$ cup of flour • $\frac{3}{4}$ cup of sugar • 1 tsp. of lemon juice

Amara wants to make a recipe that isn't too sweet.

1. She thinks Recipe C will be the least sweet because it has the least amount of sugar. Do you agree? Explain your thinking.
2. Which recipe should she make? Explain your thinking.
3. Is the relationship between number of servings and total amount of sugar proportional for each recipe? Explain your thinking.



Unit 7.4, Lesson 2: Peach Cobbler

Name(s) _____

Activity 2: Adjusting a Recipe

- Jamar is making Recipe B for his family. Determine how much of each ingredient he needs for one serving.

Recipe B

Number of Servings: 1

_____ lb. of peaches

_____ cup(s) of butter

_____ cup(s) of flour

_____ cup(s) of sugar

_____ tsp. of lemon juice

- He wants to make just enough for 3 adults and 3 children. The children will eat less than the adults. How many servings should Jamar make? _____

Use the serving size you chose to adjust Recipe B.

Recipe B

Number of Servings: _____

_____ lb. of peaches

_____ cup(s) of butter

_____ cup(s) of flour

_____ cup(s) of sugar

_____ tsp. of lemon juice

- Jamar has a measuring spoon that is $\frac{1}{8}$ teaspoon. How many spoonfuls of lemon juice does he need to make this recipe?

Unit 7.4, Lesson 2: Notes

Name _____

My Notes

Kwasi is making banana bread.

- He only has a $\frac{1}{4}$ cup measuring scoop. How many scoops of sugar and flour does he need?

Kwasi's Recipe

Number of servings: 6

- 2 lb. of bananas
- $\frac{1}{2}$ cup of butter
- $\frac{3}{4}$ cup of sugar
- $2\frac{1}{2}$ cups of flour
- 1 tsp. of baking soda

- A person Kwasi is planning to share his banana bread with wants to know how much sugar there is per serving in his recipe. What should Kwasi tell them?
- Kwasi wants to make a larger loaf to serve 10 people. How much of each ingredient will he need?

Summary

I can use the constant of proportionality to solve problems that involve fractions.



Unit 7.4, Lesson 2: Practice Problems

Name _____

Warm-Up

What number is 40% of 160?

What number is 160% of 40?

Practice

A cyclist bikes 3.75 miles in 0.3 hours.

- 1.1 How fast was she biking in miles per hour?
- 1.2 At that rate, how long will it take her to bike 4.5 miles?
2. A recipe calls for $\frac{1}{2}$ cup of sugar and 1 cup of flour. Complete the table to show how much sugar and flour is needed for different batches of the recipe.

Sugar (cups)	Flour (cups)
$\frac{1}{2}$	1
$\frac{3}{4}$	
	$1\frac{3}{4}$
1	
	$2\frac{1}{2}$

A punch recipe calls for $1\frac{1}{2}$ quarts of sparkling water and $\frac{3}{4}$ of a quart of grape juice.

- 3.1 How much sparkling water would you need to mix with 9 quarts of grape juice?
- 3.2 How much grape juice would you need to mix with $3\frac{3}{4}$ quarts of sparkling water?
- 3.3 How much of each ingredient would you need to make 75 quarts of punch?

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Unit 7.4, Lesson 2: Practice Problems

4. Circle **all** of the ratios that are equivalent to 4 : 5.

A. 2 : 2.5 B. 3 : 4 C. 3 : 3.75 D. 8 : 10 E. 14 : 27.5

Crater Lake in Oregon is shaped like a circle with a diameter of about 5.5 miles.

- 5.1 How far is it around the outside of Crater Lake?

- 5.2 What is the area of Crater Lake's surface?

A certain type of car has room for 4 passengers.

- 6.1 Write an equation relating the number of cars, n , to the number of passengers, p .

- 6.2 How many passengers could fit in 78 cars?

- 6.3 How many cars would be needed to fit 78 passengers?

Explore

A school sends out a survey to all of its students. 93.6% of the students complete the survey.

What are some possibilities for the exact number of students that attend the school?

Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

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This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 3: Notes

Name _____

My Notes

StuckStickers makes pins in addition to stickers.

- Here is Cho's design and thinking for a pin that is $\frac{3}{4}$ inches wide.

Cho's Design

Cho's Thinking

Height (in.)		Width (in.)
3	$\cdot 1\frac{1}{2}$	$4\frac{1}{2}$
	$\div 1\frac{1}{2}$	$\frac{3}{4}$

Explain how Cho figured out how tall the pins should be.

- Hamza wants to create pins with his design as well. Hamza's pins will be $\frac{4}{5}$ inches tall. What will the width of his pin be?



Summary

I can use a table to determine an unknown value in a proportional relationship.

Unit 7.4, Lesson 3: Practice Problems

Name _____

Warm-Up

It takes an ant farm 3 days to consume $\frac{1}{2}$ of an apple. At that rate, how many days will it take the ant farm to consume 3 apples?

Practice

A snail is moving away from a rock. The equation $d = 3t$ represents the relationship between the distance, d , in inches that the snail is from the rock and time, t , in minutes.

- What does the number 3 represent in the equation?
- How many minutes does it take for the snail to reach a distance of 9 inches from the rock?
- How far will the snail be from the rock after 9 minutes?

At a deli counter, someone buys:

- $1\frac{3}{4}$ pounds of ham for \$14.50.
- $2\frac{1}{2}$ pounds of turkey for \$26.25.
- $\frac{3}{8}$ of a pound of roast beef for \$5.50.

- Which deli meat is the **least** expensive per pound?
- Which deli meat is the **most** expensive per pound?
- Angel checks out 12 library books and Inola checks out $\frac{1}{3}$ less than that. How many books does Inola check out?

Unit 7.4, Lesson 3: Practice Problems

4. To make a shade of paint called Jasper Green, mix 4 quarts of green paint with $\frac{2}{3}$ of a cup of black paint.

How much green paint should be mixed with 4 cups of black paint to make Jasper Green?

5. Could a circle have both a diameter of 7.2 inches and a circumference of 28 inches? Explain why or why not.

Explore

Fill in the blanks using the digits 0 to 9 no more than once each. Use the space below to record any of your thinking as you experiment.

$$\frac{\square}{\square} \text{ of } \square = \frac{\square}{\square} \text{ of } \square$$

Reflect

- Put a smiley face next to the question you spent most time on.
- Use the space below to ask one question you have or to share something you are proud of.

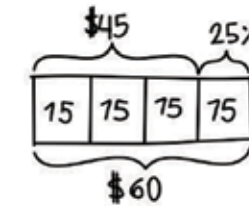
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 4: Notes

Name _____

My Notes

Here are two different representations Pablo used to figure out the new price of a pair of headphones after using a coupon.



TAPE DIAGRAM

OLD	NEW
100%	75%
	$\times \frac{3}{4}$
\$60	\$45
	$\times \frac{3}{4}$

TABLE

- What was the original price of the headphones? Circle where you see it in each representation.
- What is the **percent increase** or **percent decrease**? Star where you see it in each representation.
- Choose one representation and explain how Pablo used it to figure out the new price of the headphones.

Summary

- I can use tape diagrams and tables to represent adding or subtracting a percentage from 100%.
- I can determine the new amount if I know the original amount and the percent change.



Unit 7.4, Lesson 4: Practice Problems

Name _____

Warm-Up

Solve each equation.

$$\frac{5}{2} \cdot x = 1$$

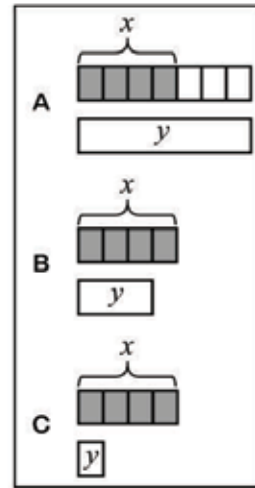
$$x \cdot \frac{7}{3} = 1$$

$$1 \div \frac{11}{2} = x$$

Practice

Match each situation to a diagram.

- 1.1 Hoang drinks x ounces of juice. Nekeisha drinks $\frac{1}{4}$ less than that.
- 1.2 Hoang runs x miles. Nekeisha runs $\frac{3}{4}$ more than that.
- 1.3 Hoang buys x pounds of almonds. Nekeisha buys $\frac{1}{4}$ of that.



Draw diagrams to represent the following situations.

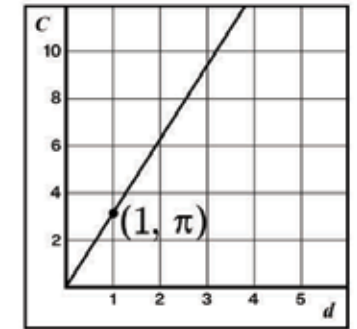
- 2.1 The amount of flour that the bakery used this month was a 40% increase compared to last month.
- 2.2 The amount of milk that the bakery used this month was a 75% decrease compared to last month.
- 3. At the beginning of the month, there were 80 ounces of peanut butter in the pantry. Since then, our family has eaten 30% of the peanut butter. Which expression represents the ounces of peanut butter left in the pantry?
 A. $0.7 \cdot 80$ B. $0.3 \cdot 80$ C. $8 - 0.30$ D. $(1 + 0.3) \cdot 80$

Unit 7.4, Lesson 4: Practice Problems

A grocer can buy strawberries for \$1.38 per pound.

- 4.1 Write an equation relating the cost, c , and the pounds of strawberries, p .
- 4.2 A strawberry order costs \$241.50. How many pounds did the grocer order?

- 5. This graph shows the relationship between the diameter and the circumference of a circle, with the point $(1, \pi)$ shown. Find and label **three** more points that are on the line.



Explore

Fill in the boxes to make a true sentence. First, use digits 1–9 as many times as you want. Then try again without repeating any digits.

is 50% of
 and 75% of

What do you notice about all the solutions?

Reflect

- 1. Circle the problem you are most proud of completing.
- 2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

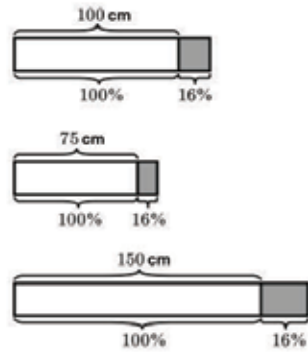
Unit 7.4, Lesson 5: Notes

Name _____

My Notes

- Each rectangle is 16% longer than the original. Complete the table with the length of each new rectangle.

Original Rectangle Length (cm)	New Rectangle Length (cm)
100	
75	
150	



- Write at least two different equations that represent the relationship between the length of the original rectangle, b , and the length of new rectangle, c .
- Write at least one equation for the relationship between the length of an original rectangle and the length of a new rectangle that is 16% shorter.

Summary

I can write an equation to represent adding or subtracting a percentage from 100%.

Unit 7.4, Lesson 5: Practice Problems

Name _____

Warm-Up

Circle the decimal number that is the best estimate of the fraction $\frac{29}{40}$. Explain your reasoning.

- A. 0.5 B. 0.6 C. 0.7 D. 0.8

Practice

Write a situation that matches the diagram, or make a diagram that matches the situation.

Situation	Diagram
1.1 The number of people in a town with high-speed internet access has increased by 50% in the past decade.	
1.2	
1.3 The amount of paper that the copy shop used this month decreased by 20% compared to what they used last month.	
1.4	
1.5 The number of miles driven this month is 30% less than the number of miles driven last month.	

Unit 7.4, Lesson 5: Practice Problems

A pair of designer sneakers was purchased for \$120. Since the purchase, the price of the sneakers has increased by 15%.

- 2.1 What is the new price?
- 2.2 If x is the price before the increase and y is the price after the increase, which equations are correct? Circle **all** that apply.

- A. $y = 1.15x$ B. $y = x + 0.15$ C. $y = x + 0.15x$
 D. $y = x + 15$ E. $y = (1 + 0.15)x$

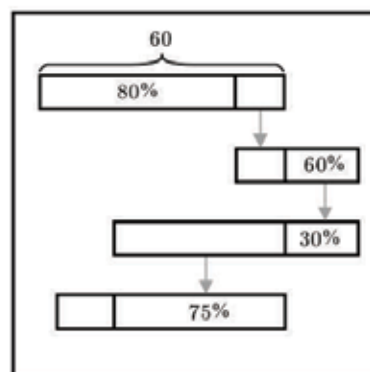
- 3.1 Write a story that can be represented by the equation $y = x + \frac{1}{5}x$.

- 3.2 What is the value of y when x is 40? What does that number mean in your story?

Explore

Here are four tape diagrams. Each diagram is split into two pieces that add up to 100%.

The top diagram has a length of 60 units. Determine the length of the bottom diagram.



Reflect

- Circle the question you feel most confident about.
- Use the space below to ask one question you have or to share something you are proud of.

Unit 7.4, Lesson 6: 100%

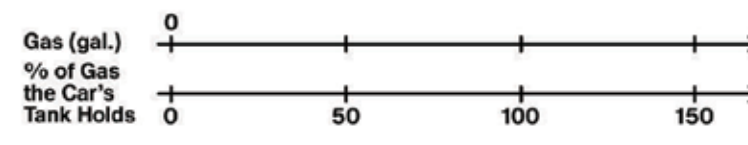
Name _____

Activity 1: Double Number Lines

For each problem, fill in missing values on the double number line diagram to show the percentages that correspond to the original amount and to the new amount. Then answer the question.

1. The gas tank in a car holds 12 gallons. The gas tank in a truck holds 50% more. How much gas does the truck's tank hold?

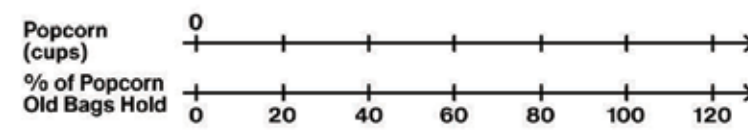
Complete the diagram.



Answer the question.

2. At a movie theater, the size of popcorn bags decreased by 20%. If the old bags held 15 cups of popcorn, how much do the new bags hold?

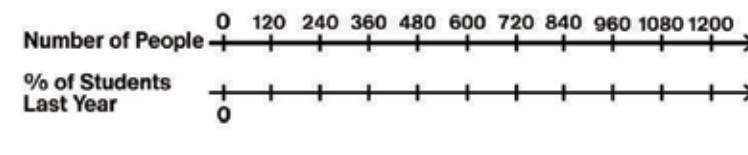
Complete the diagram.



Answer the question.

3. A school had 1 200 students last year and only 1 080 students this year. What was the percent decrease in the number of students?

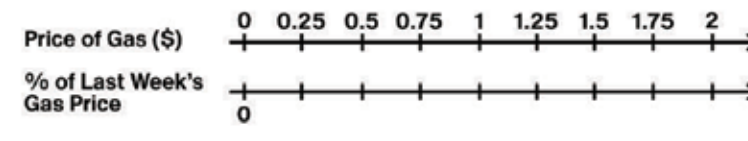
Complete the diagram.



Answer the question.

4. Last week, gas was \$1.25 per gallon. This week, gas was \$1.50 per gallon. By what percent did the price increase?

Complete the diagram.



Answer the question.

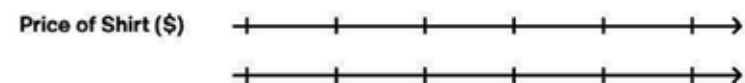
Unit 7.4, Lesson 6: 100%

Name _____

5. After a 20% discount, the price of a T-shirt is \$24. What was the price before the discount?

Complete the diagram.

Answer the question.



6. The population of Boom Town has increased 25% since last year. The population is now 6 600. What was the population last year?

Complete the diagram.

Answer the question.



Activity 2: Green Sea Turtles

Some beaches where green sea turtles come ashore to lay eggs have been made protected sanctuaries so the eggs will not be disturbed.



This year, there were 234 nesting turtles at a sanctuary. That number is a 10% decrease compared to last year.

Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line

Table

Equation



How many nesting turtles were at the sanctuary last year?

Unit 7.4, Lesson 6: Notes

Name _____

My Notes

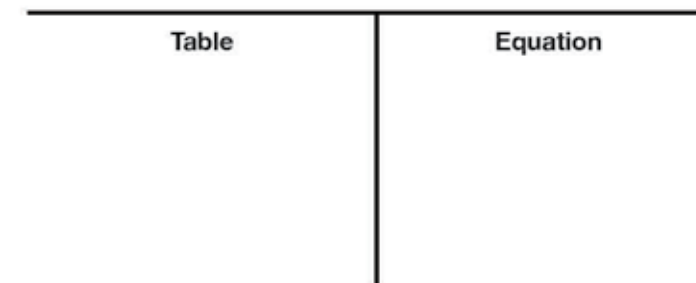
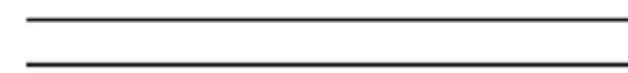
At a turtle sanctuary, the number of nesting turtles decreased by 10% compared to last year.



This year, there are 234 nesting turtles.

1. Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line



Table

Equation

2. How many nesting turtles were at the sanctuary last year?

Summary

- I can use double number lines to represent adding or subtracting a percentage from 100%.
- I can determine the original amount if I know the new amount and the percent change.

Unit 7.4, Lesson 6: Practice Problems

Name _____

Warm-Up

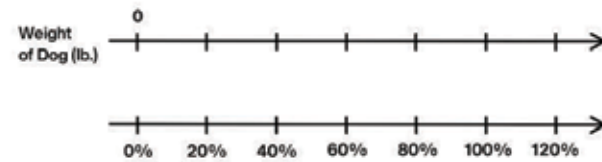
Circle **all** of the expressions that represent an 8% increase compared to x .

- A. $0.08x$ B. $x + 0.08$ C. $1.08x$ D. $x + 0.08x$ E. $(1 + .08)x$

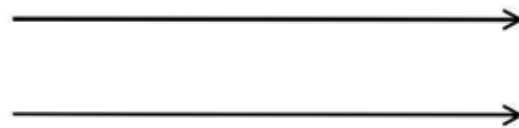
Practice

For each problem, complete the double number diagram if it is helpful. Then answer the question.

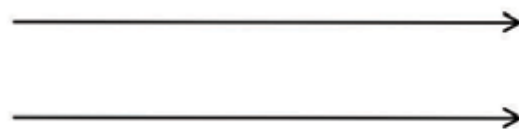
- 1.1 A dog weighs 20% more than it did three months ago. It weighs 36 pounds now. How much did the dog weigh three months ago?



- 1.2 Jessica estimated that her family used 30% more water this month compared to last month. They used 12 000 gallons of water last month. How much water did they use this month?



- 1.3 A bakery used 25% less butter this month than last month. The bakery used 240 kilograms of butter this month. How much did it use last month?



Each week, the price of oranges at the farmer's market increases by 20%.

- 2.1 Circle **all** the equations that represent the relationship between the price of oranges last week, x , and the price of oranges this week, y .

- A. $y = \frac{1}{5}x$ B. $y = \frac{6}{5}x$ C. $y = x + \frac{1}{5}x$ D. $y = x + 2$ E. $y = 1.2x$

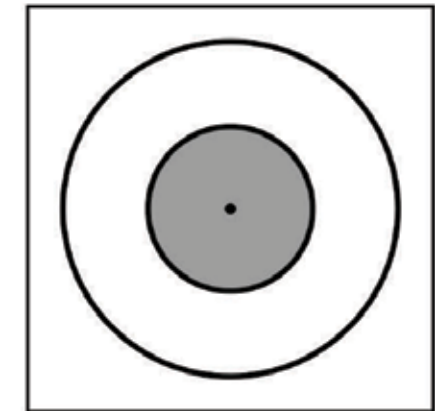
Unit 7.4, Lesson 6: Practice Problems

- 2.2 The price of oranges this week is \$4.50. What was the price last week?

Here is a circle and a scaled copy of the circle with a scale factor of 2.

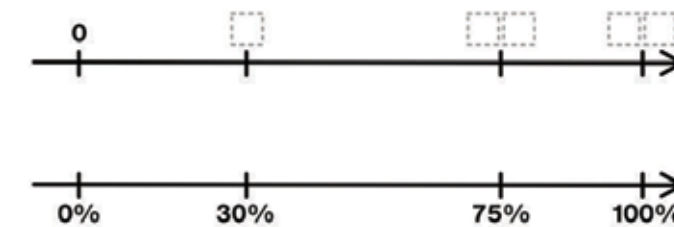
- 3.1 How does the **circumference** of the scaled copy compare to the circumference of the original circle?

- 3.2 How does the **area** of the scaled copy compare to the area of the original circle? Explain your thinking.



Explore

Using the digits 0–9 no more than once each, fill in the boxes to create an accurate number line. Use the space below to record any of your thinking as you experiment.



Reflect

- Put a smiley face next to the question you spent most time on.
- Use the space below to ask one question you have or to share something you are proud of.



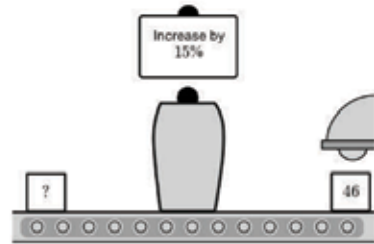
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 7: Notes

Name _____

My Notes

- A number went into this machine and 46 came out. What number went in? Explain your strategy.



- 50 went into a different machine and 46.5 came out. What percent increase or decrease did this machine use?
- What are some important things to remember about figuring out the original value given the new value and a percent increase or decrease?

Summary

I can determine the original amount if I know the new amount and the percent change for one-step and multistep problems.

Unit 7.4, Lesson 7: Practice Problems

Name _____

Warm-Up

If x represents a positive number, circle **all** of the expressions whose value is greater than x .

A. $\frac{7}{8}x$

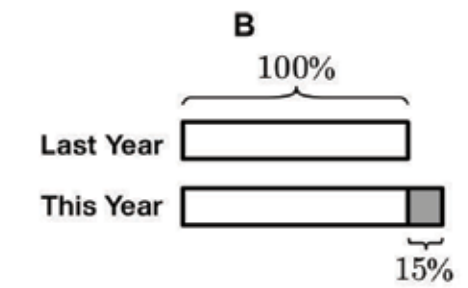
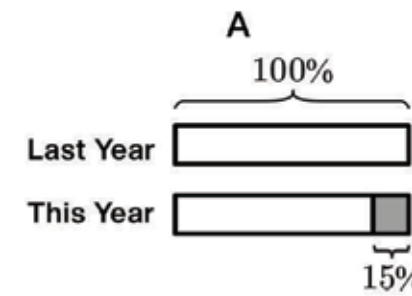
B. $\frac{9}{8}x$

C. $(1 - \frac{1}{4})x$

D. $(1 + \frac{1}{4})x$

Practice

For each situation below, decide whether diagram A or B represents the situation.



- The amount of apples this year decreased by 15% compared to last year's amount. ____
 - The amount of pears this year is 85% of last year's amount. ____
 - The amount of cherries this year increased by 15% compared to last year's amount. ____
 - The amount of oranges this year is 115% of last year's amount. ____
- Mateo's aunt bought a share of stock many years ago. The value of the stock increased by 80%. Its value is now \$270. What was the value of the stock when Mateo's aunt bought it?



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Practice Day 1: Question Cards

1. Is the statement below true or false? Explain. The equation $y = 1.7x$ represents the value of x increased by 7%.

2. Is the statement below true or false? Explain. The equations $y = 0.75x$ and $y = x - 0.25x$ are equivalent.

3. A mochi cupcake recipe uses $\frac{1}{2}$ of a cup of milk for every $1\frac{1}{2}$ cups of rice flour. How much milk is needed for $3\frac{3}{4}$ cups of rice flour?

Milk (cups)	Rice Flour (cups)
$\frac{1}{2}$	$1\frac{1}{2}$
	$3\frac{3}{4}$

4. Ichiro bought 4 yards of ribbon for \$10. Wohall wants to buy 5 yards of ribbon. How much will it cost?

Ribbon (yards)	Cost (\$)
4	10
5	

Unit 7.4, Lesson 7: Practice Problems

3.1 What is 18% more than 61?

3.2 10% more than a number is 132. What is the number?

3.3 140 is what percent less than 160?

Determine how many feet each member of Lola's family walked.

4.1 Lola's pet turtle walked 10 feet, and then half that length again.

4.2 Lola's baby brother walked 3 feet, and then half that length again.

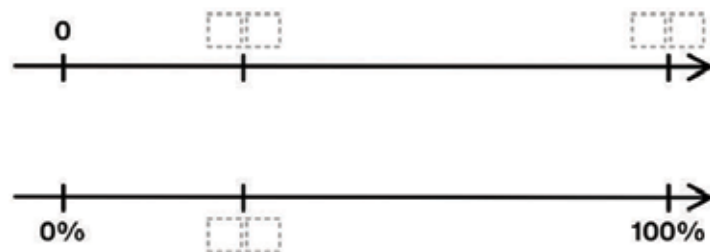
4.3 Lola's hamster walked 6.5 feet, and then half that length again.

4.4 Lola's mom walked x feet, and then half that length again.

Explore

Using the digits 0–9 no more than once each, fill in the boxes to create an accurate number line. How many solutions can you find?

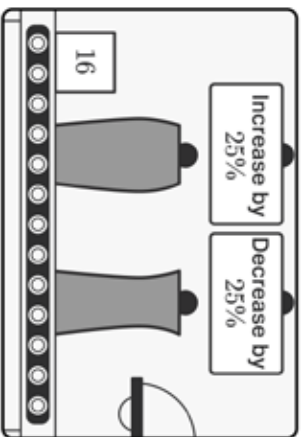
Use the space below to record any of your thinking as you experiment.



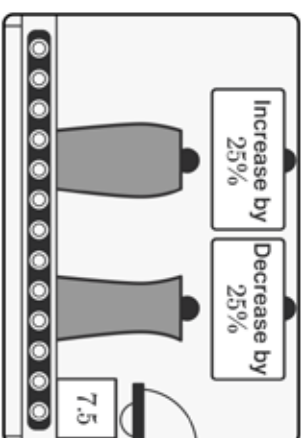


Unit 7.4, Practice Day 1: Question Cards

9. If we put 16 into this machine, what will come out?

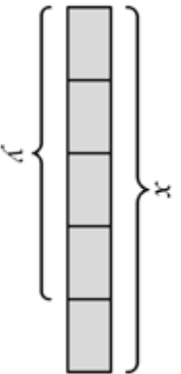


10. A number went into this machine and 7.5 came out. What number went in?



11. Describe a situation that this diagram could represent.

Be sure to explain what x and y mean in your situation.

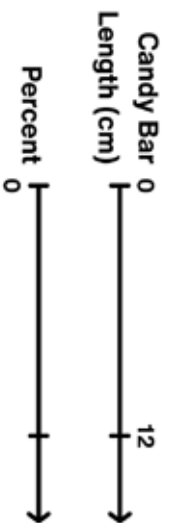


12. Describe a situation that could be represented by the equation $y = x + \frac{1}{4}x$.

Be sure to explain what x and y mean in your situation.

Unit 7.4, Practice Day 1: Question Cards

5. A candy bar is 12 centimeters long. The miniature bar is 80% shorter than the original. How long is the miniature version?



6. Irelle buys the following ingredients:

- $2\frac{1}{2}$ cups of chocolate chips for \$8.00.
- 2 cups of raisins for \$6.50.
- $\frac{2}{3}$ cup of shredded coconut for \$2.00.

Which ingredient is the most expensive per cup? Show or explain your thinking.

A restaurant is increasing all of its prices by 8%.

7.1 The original price for any dessert was \$5. What is the new dessert price?

7.2 Write an equation to calculate the new price, n , when the original price is p dollars.


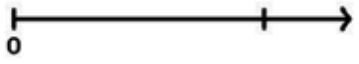
On Wednesday, all menu items at Raven's favorite restaurant cost 20% less than usual.

8.1 Usually, the cost of the dinner special is \$12. What is the cost on Wednesday?

8.2 Write an equation to calculate the discount cost, d , when the original cost is c dollars.

Unit 7.4, Practice Day 1: Workspace Sheet Name _____

Use this worksheet to record your thinking for each problem.

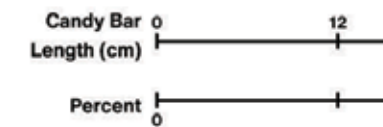
1.	2.
3.	4.
<p>5.</p> <p>Candy Bar Length (cm) </p> <p>Percent </p>	6.

Unit 7.4, Practice Day 1: Workspace Sheet Name _____

7.1	8.1
7.2	8.2
9.	10.
11.	12.

Are You Ready for More?

A candy bar is 12 cm long. The king-size bar is 15 cm long. How long is the king-size bar as a percentage of the original?



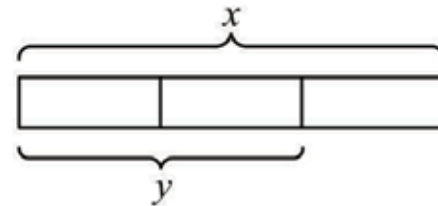


Unit 7.4, Practice Day 1: Practice Problems

Name _____

Warm-Up

Describe a situation that this diagram could represent. Be sure to explain what x and y mean in your situation.



Practice: The Middle of the Story

In this practice set, you will see problems (beginnings) and correct solutions (ends). Your task is to explain all of the parts in the middle.

Problem 1

A candy bar is 15 centimeters long. The jumbo-size bar is 60% longer than the original. How long is the jumbo candy bar?

Solution

24 centimeters

The Middle of the Story

Explain how to go from the problem to the solution.

Problem 2

Parv's favorite sneakers cost 15% less than usual this week.

- 2.1 Usually, the sneakers cost \$50. What is the cost with the discount?
- 2.2 Write an equation to calculate the discounted price, d , when the original cost is c dollars.

Solutions

- 2.1 \$42.50
- 2.2 $d = 0.85c$ (or equivalent)

The Middle of the Story

Explain how to go from the problem to the solution.

Unit 7.4, Practice Day 1: Practice Problems

Problem 3

A recipe for pumpkin bread uses $\frac{3}{4}$ of a cup of pumpkin and 2 cups of flour.

Typically, there are $1\frac{7}{8}$ cups of pumpkin in a can.

How many cups of flour would you need to make bread with a can of pumpkin?

Solution

5 cups of flour

Problem 4

If you take the number 20, increase it by 25%, and then decrease it by 25%, what will the result be?

Solution

18.75

The Middle of the Story

Explain how to go from the problem to the solution.

The Middle of the Story

Explain how to go from the problem to the solution.

Reflect

- 1. What is one math concept from this unit that you have improved on since the unit started? Explain what you did to help yourself improve.
- 2. What questions do you have about this unit so far?



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 8: Notes

Name _____

My Notes

1. What are **sales tax** and **tip**?

2. Use this receipt to figure out the total amount this customer paid for their \$20 meal after an 18% off coupon and 7.5% sales tax.

Original Cost	\$20.00
18% Off Coupon	\$ 3.60
Subtotal	\$ 16.40
7.5% Tax	\$ 1.23
Total	\$?.??

3. Which would result in the greatest total amount?

- Tax first, then coupon.
- Coupon first, then tax.
- They are the same.
- Not enough information.

Explain your thinking.

Summary

I can solve multistep problems about sales tax and tip.

Unit 7.4, Lesson 8: Practice Problems

Name _____

Warm-Up

Maia walks 12 miles. Then she walks $\frac{1}{4}$ of that distance.

Circle **all** of the expressions that represent how far she walks altogether.

- A. $12 + 0.25 \cdot 12$ B. $12(1 + 0.25)$ C. $12 \cdot 1.25$ D. $12 \cdot 0.25$ E. $12 + 0.25$

Practice

1. In a city in Ohio, the sales tax rate is 7.25%. Complete the table.

Item	Price Before Tax (\$)	Sales Tax (\$)	Price Including Tax (\$)
Pillow	8.00		
Blanket	24.00		
Trash can		1.16	

A family eats at a restaurant. The bill is \$42. The family leaves a tip and spends \$49.77 total.

- 2.1 How much money does the family tip?
- 2.2 How much is the tip as a percentage of the bill?

A music store buys instruments and then sells them for 30% more than they paid.

- 3.1 If the store buys a guitar for \$45, what will the store sell it for?
- 3.2 If the price tag on a trumpet says \$104, how much did the store pay for it?
- 3.3 During a 20% off sale, the store offers a clarinet for \$93.60. How much did the store pay for the clarinet?

Unit 7.4, Lesson 8: Practice Problems

4.1 The sales tax rate in New Mexico is 5.125%. Circle **all** of the equations that represent the sales tax, t , you would pay in New Mexico for an item of cost c .

A. $t = 5.125c$ B. $t = 0.5125c$ C. $t = 0.05125c$

D. $t = c \div 0.05125$ E. $t = \frac{5.125}{100}c$

4.2 A pair of pants in New Mexico costs \$30 before tax. How much does the pair of pants cost after tax?

Explore

Three different items' price tags have fallen off. Match up the original price, the discount, and the discounted price for each item. Then fill in the missing discounted price.

Original Price	Discount	Discounted Price
\$24	20%	\$21
\$35	30%	\$24
\$30	40%	\$

Use the table to show your solution.

Original Price	Discount	Discounted Price
	20%	
	30%	
	40%	

Reflect

- Circle a question that you are still unsure of or are wondering about.
- Use the space below to ask one question you have or to share something you are proud of.

Unit 7.4, Lesson 9: Minimum Wage

Name _____

Activity 1: Waiting Tables

Here is information about four servers who work at different restaurants: Laila, Tiana, Peter, and Julian. Select one of these people below. Make sure each group member selects a different person.

<input type="checkbox"/> Laila is 35 years old. She is married and has two children. She has worked at the same restaurant for 7 years. She works 40 hours per week and makes \$2.13 per hour. In a typical week, she serves 75 tables. The average bill at the restaurant is \$41 per table, and she typically receives an 18% tip.	<input type="checkbox"/> Tiana is 25 years old. She lives with a roommate and a dog. She has worked at a fancy restaurant for 6 months. She works 40 hours per week and makes \$2.13 per hour. She usually serves 45 tables per week. The average bill at the restaurant is \$130 per table, and she typically receives a 20% tip.
<input type="checkbox"/> Julian is 29 years old. He lives in Virginia with his 3-year-old son. He just finished his third year as a server. He works 40 hours per week and makes \$2.13 per hour. In a typical week, he serves 95 tables. The average bill at the restaurant is \$22 per table, and he typically receives a 15% tip.	<input type="checkbox"/> Peter is 19 years old. He lives at home with his parents and goes to college part-time. He recently started as a server, working 40 hours per week. Where Peter lives, the minimum wage for tipped and non-tipped employees is \$7.25 per hour. In the average week, he serves 90 tables whose typical bill is \$21 with an average tip of 15%.

With the support of your group, answer the questions below for the person(s) you selected.

- How much money does your person make in a typical week?
- Suppose people at the restaurant increase their tipping percentage by 5 percentage points (for example, 18% becomes 23%).

How much would your person make now? | By what *percent* would their pay increase?

- Discuss the following with your group:
 - Which of the four people makes the most money?
 - Whose pay increases by the highest percentage when the tips increase by 5%?
 - Do you think the way we pay servers in these examples is fair? Why or why not?



Unit 7.4, Lesson 9: Minimum Wage

Name _____

Activity 2: What's Fair?

1. Some restaurants have experimented with a different approach to paying servers. One approach is that servers would make \$15 per hour, but are not allowed to accept tips.

Which of the four people do you think would be happy with this approach? Why?

2. Consider these three approaches to paying servers that we have seen so far:

- A. Servers get paid \$2.13 per hour, plus tips.
- B. Servers get paid \$7.25 per hour, plus tips.
- C. Servers get paid \$15 per hour, with no tips.

Invent and describe a system to determine a server's pay that you think is fairer than the ones above. Calculate what each of the four people would earn under your system.

Are You Ready for More?

Danny Meyer owns 15 restaurants in New York City. In 2015, he announced that tipping would be eliminated at his restaurants, while the price of menu items would increase by 20%. Using a search engine, find and read at least one article about this (for instance, search "Danny Meyer tipping").

After reading, answer this question on a separate sheet of paper: *If you owned a restaurant, would you ban tipping? Why or why not?*

Unit 7.4, Lesson 9: Notes

Name _____

My Notes

Adrian is a 25-year-old who plays in a band and works 30 hours per week as a server. He makes minimum wage, which is \$5.45 per hour in his town. Adrian also collects tips. The average tip he receives is 15% of the bill. The typical bill is \$25 per table, and he serves 70 tables in an average week.

1. How much money does Adrian make in a typical week?

Imagine that the average tip Adrian receives is 20% instead of 15%.

- 2.1 How much money would he make now?

- 2.2 By what percent would his pay increase?

Summary

I can use proportional relationships and percent change to analyze an issue in society.

Unit 7.4, Lesson 9: Practice Problems

Name _____

Warm-Up

Circle the expression that represents a 15% tip on a \$20 meal.
Put a check next to the expression that represents the total bill.

$15 \cdot 20$ $20 + 1.5 \cdot 20$ $1.15 \cdot 20$ $\frac{15}{100} \cdot 20$

Practice

Match each situation with one equation.

- | | |
|---|-----------------|
| 1.1 Tay practices piano for x hours. Omar practices for $\frac{2}{5}$ less than that. _____ | A. $y = 2.3x$ |
| 1.2 Tay sleeps for x hours. Omar sleeps for $\frac{1}{5}$ less than that. _____ | B. $y = 1.375x$ |
| 1.3 Tay drinks x ounces of juice. Omar drinks $\frac{13}{10}$ more than that. _____ | C. $y = 0.6x$ |
| 1.4 Tay spends x dollars. Omar spends $\frac{1}{4}$ less than that. _____ | D. $y = 0.8x$ |
| 1.5 Tay eats x grams of almonds. Omar eats 40% more than that. _____ | E. $y = 0.75x$ |
| 1.6 Tay collects x pounds of recycling. Omar collects $\frac{3}{5}$ less than that. _____ | F. $y = 1.6x$ |
| 1.7 Tay walks x kilometers. Omar walks $\frac{3}{8}$ more than that. _____ | G. $y = 0.4x$ |
| 1.8 Tay completes x puzzles. Omar completes $\frac{3}{5}$ more than that. _____ | H. $y = 1.4x$ |

Write each percent increase or decrease as a percentage of the initial amount. Then write an equation for the situation. The first one is done for you.

- 2.1 There was 40% more snow this year than last year.
The amount of snow this year is 140% of the amount of snow last year. $y = 1.4x$
- 2.2 There were 22% fewer sunny days this year than last year.
- 2.3 There was an 8.5% increase in the number of houses sold this month compared to last month.
- 2.4 A runner took 5.4% less time to complete a marathon this year than she did last year.

Unit 7.4, Lesson 9: Practice Problems

3. A store has a 30% off sale on shirts. With this discount, the price of one shirt is \$15.40. What was the original price of the shirt?
4. Circle A has a circumference of $2\frac{2}{3}$ meters. Circle B has a diameter that is $1\frac{1}{2}$ times as long as circle A 's diameter. What is the circumference of circle B ? Explain your thinking.

Explore

Here are three receipts for meals at the same restaurant. Fill in the missing values on each receipt.

Receipt #1		Receipt #2		Receipt #3	
Burger	<input type="text"/>	Salad	<input type="text"/>	Salad	<input type="text"/>
Chips	\$3.00	Chips	\$3.00	Water	<input type="text"/>
Total	\$12.00	Total	<input type="text"/>	Total	<input type="text"/>
18% Tip	<input type="text"/>	18% Tip	+\$1.98	18% Tip	<input type="text"/>
Total With Tip	<input type="text"/>	Total With Tip	<input type="text"/>	Total With Tip	\$11.21

Reflect

- Circle the question that you are **least** confident about on this practice worksheet.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 10: Cost of College

Name _____

Activity 1: Minimum Wage vs. Cost of College

This table shows the federal minimum wage and cost of college over several years.

Year	Minimum Wage	Cost of College*
1990	\$3.80	\$2 900
2000	\$5.15	\$5 200
2010	\$7.25	\$9 100
2017	\$7.25	\$12 200

1. Circle two years in the table. By what percent did the minimum wage increase between those two years? The cost of college?
2. Generally, have the minimum wage and the cost of college increased at the same rate? Is this fair? Explain your thinking.
3. A typical work week is 40 hours. If you worked a minimum wage job in 1990, how many weeks did you have to work in order to pay for college? In 2017?

*Average one-year cost for tuition and fees in current dollars. Source: National Center for Education Statistics.

Unit 7.4, Lesson 10: Cost of College

Name _____

Activity 2: Future Cost

This table shows the cost of college in 2016 and 2017.

Year	Cost of College
2016	\$11 900
2017	\$12 200

1. What is the percent change in the cost of college between 2016 and 2017?
2. Suppose the percent increase stays constant. Write an equation for the relationship between the cost of college one year, x , and the cost of college the next year, y .
3. How much will college cost when you graduate from high school? Show or explain your thinking.
4. What do you think would be a fair minimum wage in order to reasonably pay for the cost of college when you graduate high school?

Are You Ready for More?

Madame C. J. Walker was a business woman who made her fortune by developing a line of cosmetics and hair care for Black women. In 1919, her wealth was valued at approximately \$1 000 000. Every dollar in 1919 is worth 1463% more in 2020. How much would Madam C.J. Walker's fortune be worth in 2020 dollars?

Unit 7.4, Lesson 10: Notes

Name _____

My Notes

Between 2017 and 2018, the city of San Francisco raised its minimum wage from \$14.00 to \$15.00.

- 1.1 What is the percent increase?
 - 1.2 Write an equation for the relationship between the minimum wage in 2017, x , and the minimum wage in 2018, y .
 - 1.3 If the percent increase stayed constant, how much should minimum wage be in San Francisco in 2020? Show or explain your thinking.
2. Explain to a family member how the cost of college has changed over time compared to minimum wage. What is important for them to know?

Summary

- I can write equations to represent the cost of college over time.
- I can solve problems about the cost of college over time.

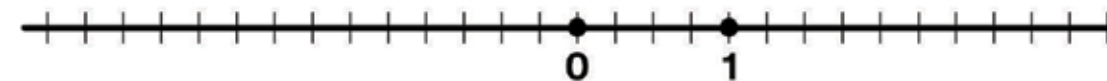
Unit 7.4, Lesson 10: Practice Problems

Name _____

Warm-Up

Place and label the following numbers on the number line.

0.5 -1 $\frac{3}{2}$ $-\frac{3}{2}$



Practice

A college student takes out a \$7 500 loan from a bank. Assuming the student has not started paying back the money, how much does the student owe . . .

- 1.1 . . . after 1 year, if the bank charges 3.8% interest each year?
- 1.2 . . . after 1 year, if the bank charges 7.6% interest each year?
- 1.3 . . . after 2 years, if the bank charges 3.8% interest each year?

Write a situation that matches the diagram, or make a diagram that matches the situation.

Situation	Diagram
2.1 Caasi donated \$80 to a charity online. The website charged an additional 10% on top of the donation.	
2.2	

Unit 7.4, Lesson 10: Practice Problems

In order to make a specific shade of green paint, a painter mixes $\frac{1}{2}$ of a gallon of blue paint with $\frac{4}{5}$ of a gallon of yellow paint.

- 3.1 How many gallons of yellow paint are needed to mix with 3 gallons of blue paint?

- 3.2 How many gallons of each color are needed to make 26 total gallons of this color?

- 3.3 Write an equation to represent the number of gallons of yellow paint, y , needed for any amount of blue paint, b .

- 3.4 What is the constant of proportionality in your equation?
What does it tell you about the situation?

Explore

A savings account was opened and not touched for 4 years.

The amount of money in the account grew by a consistent percentage at the end of each year.

Complete the missing values in the table.

Time (Years)	Amount (\$)
0	
1	165.00
2	181.50
3	199.65
4	

Reflect

- 1. Put a heart next to the question you are most proud of on this practice worksheet.
- 2. Use the space below to ask one question you have or to share something you are proud of.

Unit 7.4, Lesson 11: Notes

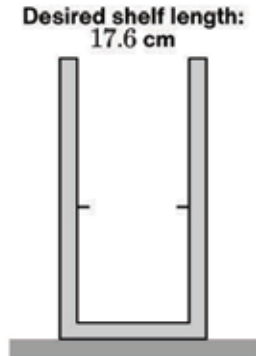
Name _____

My Notes

- 1. What is **percent error**? Create your own example.

- 2. Diamond is making a bookshelf with shelves that are supposed to be 17.6 centimeters long. Complete the table with the percent error of each shelf that Diamond builds.

Shelf Width (cm)	Percent Error
17.1	
18.25	
16.5	



- 3. The acceptable percent error is 5% for a shelf to fit. Will all of the shelves fit? Why or why not?

Summary

<input type="checkbox"/> I can explain what percent error is and how to calculate it.
<input type="checkbox"/> I can decide whether a value is within an acceptable percent error.



Unit 7.4, Lesson 11: Practice Problems

Name _____

Warm-Up

A person's resting heart rate is typically between 60 and 100 beats per minute. Rishi looks at his watch and counts 8 heartbeats in 10 seconds. Is his heart rate typical? Explain how you know.

Practice

1. A student estimates that it would take 3 hours to write a book report, but it actually takes her 5 hours. What is the percent error for her estimate?
2. It takes 48 minutes to drive downtown. An app estimated it would be less than that. If the error was 20%, what was the app's estimate?

For each story, write an equation that describes the relationship between the two quantities.

- 3.1 Ahmed collects x kilograms of recycling. Kimaya collects $\frac{2}{5}$ more than that.
- 3.2 Ahmed bikes x kilometers. Kimaya bikes $\frac{3}{10}$ less than that.
- 3.3 Ahmed reads for x minutes. Kimaya reads for $\frac{4}{7}$ of that time.

Unit 7.4, Lesson 11: Practice Problems

4. A radar gun measured the speed of a baseball at 92 miles per hour. If the baseball was actually going 90.3 miles per hour, what was the percent error in this measurement?

The reading on a car's speedometer may have an error up to 6.25%. The speed limit on a road is 65 miles per hour.

- 5.1 The car is driving 63 miles per hour. Is it possible that the speedometer will show the car driving over the speed limit? Explain your thinking.
- 5.2 The speedometer shows 67 miles per hour. Is the car definitely going over the speed limit? Explain your thinking.

Explore

A farmer sells eggs at a market. She offers three different sizes. For any size, the weight of each egg can vary by up to 8%. Calculate the missing values in the table.

Size	Advertised Weight (g)	Lightest Possible Egg (g)	Heaviest Possible Egg (g)
Medium	45		
Large		50.6	
Extra Large			66.96

Is it possible for an egg to be both large and extra large? Explain your reasoning.

Reflect

1. Put a smiley face next to the question you spent most time on.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Lesson 12: Posing Percent Problems Name(s) _____

Activity 1: Stronger and Clearer Each Time

Select the topic that interests you. Then, write two questions about the topic that you could figure out using this information and whose answer is not already given.

As you are drafting questions, ask yourself:

- *Would the answer to this question be interesting or useful?*
- *Can you answer this question using only the information given?*
- *Is the answer to the question not obvious from the information?*

First Draft of Both Questions	
Conversation Notes #1	Conversation Notes #2
Final Version of Both Questions	

Activity 2: Make a Poster

Create a poster. Here is what your poster should include:

- A descriptive title.
- The two questions you asked.
- At least one representation of the situation (tape diagram, double number line, table, equation).
- Your answers to each question (with units).
- An explanation of how you calculated each answer.
- Two new questions that you have about this topic after analyzing the data.

Unit 7.4, Lesson 12: Posing Percent Problems Name(s) _____

Activity 2: Synthesis

Which representation(s) did you find most useful for answering the question you wrote?

Explain your thinking.

Activity 3: Gallery Tour

What features of your classmates' posters helped you understand their thinking?	Describe something you would change about your poster now that you have seen other groups' work.
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Activity 4: Revisions and Reflection

1. Use your thinking from the Gallery Tour to make your poster stronger and clearer.
2. Add at least one other representation (tape diagram, double number line, table, equation) to your poster.
3. Individually, answer the questions below.

What did you learn about the wage gap and prison populations that was surprising or new?	What new questions do you have about these topics after seeing the work of other groups?
--	--



Unit 7.4, Lesson 12: Notes

Name _____

My Notes

Here is information about the wage gap.

In 1963, when the Equal Pay Act was passed, women were paid 41% less than what men were paid on average, which was about \$5 978 per year. By 2004, women were paid \$29 900 per year on average, which is about 23% less than what men were paid.

Source: National Organization for Women

1. Write at least two questions that you could figure out using this information and whose answer is not already given.
2. Answer one of the questions that you asked.
3. What are some characteristics of a good question you could ask using a set of information?

 Summary

- I can write a question about a real-world situation that involves percent increase or decrease.
- I can use what I know to answer questions about the world we live in.

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Unit 7.4, Lesson 12: Practice Problems

Name _____

Warm-Up

Mio bought x grams of flour. Sol bought $\frac{3}{8}$ more than that.

Circle **all** of the equations that represent the relationship between the amount of flour that Mio bought, x , and the amount of flour that Sol bought, y .

A. $y = \frac{3}{8}x$ B. $y = \frac{5}{8}x$ C. $y = x + \frac{3}{8}x$ D. $y = x - \frac{3}{8}x$ E. $y = \frac{11}{8}x$

Practice

A city has a 5% sales tax.

- 1.1 A toothbrush costs \$3.40 before tax. How much does it cost including tax?
- 1.2 Is there a proportional relationship between the cost of items before tax and the cost of items after tax?
If yes, what is the constant of proportionality? If no, explain why not.
- 1.3 A book costs \$32.55 after tax. How much did it cost before tax?
- 1.4 A greeting card costs \$4 before tax. A customer has a 15% discount. Then the 5% sales tax is added. How much will the customer pay for the card?
- 1.5 Does it matter if the discount is applied before or after the sales tax? Explain your thinking.

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Unit 7.4, Lesson 12: Practice Problems

- The price of gold is often reported per ounce. At the end of 2005, gold was \$513 per ounce. At the end of 2015, it was \$1 060 per ounce. By what percent did the price increase?

Zoe's oven thermometer gives a reading that is 2% higher than the actual temperature.

- If the actual temperature is 325 °F, what will the thermometer reading be?
- If the thermometer reading is 76 °F, what is the actual temperature?

Explore

The value of a is the same in each image. Determine the value of a and write it here: ____
Then fill in the blank value in each image.

		<p>Original Price </p> <p>Discount <input type="text"/> %</p> <p>Discounted Price </p>
--	--	--

Reflect

- Draw a heart next to the question you are most proud of.
- Use the space below to ask one question you have or to share something you are proud of.

Unit 7.4, Lesson 13: Decimal Deep Dive

Name _____

Activity 1: Carlos's Calculations

1.1 Finish writing $\frac{5}{8}$ as a decimal.

1.2 Write $\frac{2}{11}$ as a decimal.

$$\begin{array}{r} 0.6 \\ 8 \overline{) 5.0} \\ \underline{- 48} \end{array}$$

1.3 What is the same and what is different about these two calculations?

Same:

Different:

Activity 2: Terminating or Repeating?

Use long division to write each fraction as a decimal. Then decide if it is terminating or repeating.

2.1 $\frac{3}{20}$

2.2 $\frac{3}{9}$

2.3 $\frac{3}{5}$

2.4 $\frac{5}{6}$

(Circle one)
Terminating Repeating

(Circle one)
Terminating Repeating

(Circle one)
Terminating Repeating

(Circle one)
Terminating Repeating



Unit 7.4, Lesson 13: Decimal Deep Dive

Name _____

Activity 3: Decimal Deep Dive

Find fractions that meet as many of these requirements as you can.

Terminating decimal that ends after:

Repeating decimal that repeats every:

One digit

One digit

Two digits

Two digits

$$\frac{2}{11} = 0.\overline{18}$$

Three digits

Three digits

$$\frac{5}{8} = 0.625$$

Four digits

Four digits

Five digits

Five digits

Six digits

Six digits

Unit 7.4, Lesson 13: Notes

Name _____

My Notes

Use long division to write each number as a decimal.

1.1 $\frac{7}{8}$

1.2 $\frac{2}{3}$

1.3 Is the decimal representation of $\frac{7}{8}$ terminating or repeating?
Explain how you know.

1.4 Is the decimal representation of $\frac{2}{3}$ terminating or repeating?
Explain how you know.

2. When might it be helpful to write a fraction as a decimal?

Summary

- I can use long division to write a fraction as a decimal.
- I can decide whether a decimal is terminating or repeating and explain how I know.

Unit 7.4, Lesson 13: Practice Problems

Name _____

Warm-Up

Select **all** of the true statements.

- $2.25 > 2$
 $2.25 < 2$
 $-2.25 > -2$
 $-2.25 < -2$
 $2.25 > -2$

Practice

1.1 Finish writing $\frac{3}{8}$ as a decimal.

$$\begin{array}{r} 0.3 \\ 8 \overline{)3.00} \\ \underline{-24} \\ 0 \end{array}$$

1.2 Is the decimal representation of $\frac{3}{8}$ terminating or repeating?

Explain how you know.

Use long division to write each fraction as a decimal.

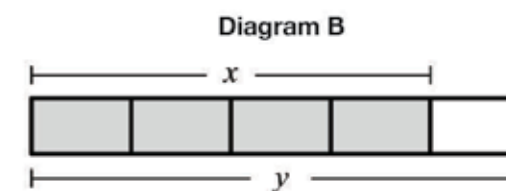
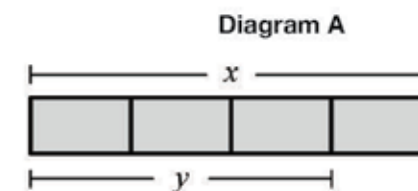
2.1 $\frac{9}{25}$	2.2 $\frac{11}{30}$	2.3 $\frac{4}{11}$
--------------------	---------------------	--------------------

Unit 7.4, Lesson 13: Practice Problems

- 2.4 What is similar about these answers and what is different? 2.5 Which of these fractions has the greatest value? How do you know?

For each description or equation, decide whether it matches Diagram A, Diagram B, or neither.

- 3.1 An increase by $\frac{1}{4}$ _____
 3.2 An increase by $\frac{1}{3}$ _____
 3.3 A decrease by $\frac{1}{5}$ _____
 3.4 A decrease by $\frac{1}{4}$ _____
 3.5 $y = 1.\overline{6}x$ _____
 3.6 $y = 1.\overline{3}x$ _____
 3.7 $y = 0.75x$ _____
 3.8 $y = 1.25x$ _____



Explore

Make a true statement by filling in the blanks using any of the digits 1 to 9 without repeating.

$$\frac{\boxed{}}{\boxed{}} = 0.\boxed{}$$

Reflect

1. Draw a heart next to the question you are most proud of.
2. Use the space below to ask one question you have or to share something you are proud of.

This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.4, Practice Day 2: Task Cards

Fix It!

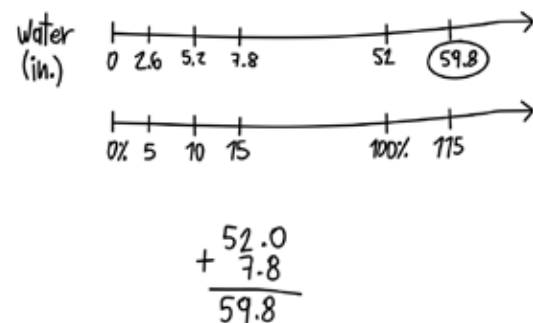
Look at the work for each problem below and then do the following:

1. Explain the error the person made.
2. Calculate the correct solution.

Problem A

After a storm, the water depth in a reservoir is 52 meters.

If this is a 15% increase, what was the original water depth before the storm?



Problem B

The crowd at a sporting event is estimated to be 2 500 people.

The exact attendance is 2 680 people.

What is the percent error?

$$\frac{180}{2500} = 0.072$$

$$0.072 \cdot 100 = 7.2\%$$

Problem C

A certain shade of blue paint is made by mixing $\frac{1}{2}$ of a quart of blue paint with $\frac{1}{8}$ of a quart of white paint.

How much white paint would you need to mix with $2\frac{2}{3}$ quarts of blue paint to make the same shade of paint?

White		Blue
$\frac{1}{8}$	+	$\frac{3}{8}$
$\frac{1}{8}$	→	$\frac{1}{2}$
$2\frac{7}{24}$	+	$\frac{3}{8}$
$2\frac{7}{24}$	→	$2\frac{2}{3}$

Unit 7.4, Practice Day 2: Task Cards

Ice Cream

Troy is making chocolate ice cream for a party.

1. The recipe Troy is using calls for $\frac{1}{4}$ of a cup of cocoa powder for each $\frac{1}{2}$ of a quart of ice cream. How many quarts of ice cream can Troy make for each cup of cocoa powder?
2. A serving of ice cream is $\frac{1}{8}$ of a quart. How many servings are in $1\frac{1}{2}$ quarts of chocolate ice cream?
3. Troy planned to make enough ice cream for 15 servings but only made 13 servings. What is the percent error in this situation?



Unit 7.4, Practice Day 2: Task Cards

Everything On Sale!

A store is having a sale for 30% off everything.

1. Is there a proportional relationship between the original price of an item and its sale price? Explain your thinking.

2. Koharu wants to buy a pair of sneakers that costs \$80. She has a coupon for \$30 off the sneakers. The store will only allow her to use one discount. Which discount will result in the lowest price? Explain your thinking.

A. \$30 off

B. 30% off

3. Deja wants to purchase a grill that originally costs \$110. After the 30% discount, a 6.5% sales tax is added. How much will the grill cost?

Unit 7.4, Practice Day 2: Task Cards

Up and Down

Match each situation to one of the equations. You do not need to solve the problem.

- | | |
|--|--|
| 1.1 The height of a tomato plant is now 52 centimeters. If this is a 75% increase, what was the original height? | Equations
$0.25x = 52$
$0.75x = 52$ |
| 1.2 Over a year, some of the ice in a glacier melts. After a 25% decrease, the ice is now 52 feet deep. What was the original depth of the ice at the start of the year? | $1.25x = 52$
$1.75x = 52$ |

Write an equation to represent each situation. Then solve the problem.

2. After a 20% discount, the price of a chair is \$48. What was the price before the discount?

3. Basheera's goal is to increase her savings by 30% in one year. She currently has \$210 in savings. If she reaches her goal, what is the total amount of money she would have in her savings next year? After two years?



Unit 7.4, Practice Day 2: Task Cards

Government

The United States Congress is made up of the Senate and the House of Representatives. The Senate has 100 members and the House has 435 members. Here is some information about those members at different times in history.

95th Congress (1977–1979)

House of Representatives:

- 18 women
- 17 Black

105th Congress (1997–1999)

House of Representatives:

- 57 women
- 41 Black

111th Congress (2009–2011)

House of Representatives:

- 78 women
- 42 Black
- 25 Hispanic
- 8 Asian
- 1 Native American

1. By what percent did the women House of Representatives members increase from the 105th to the 111th Congress?
2. In 2010, 16.7% of the American population identifies as Hispanic. How many more Hispanic persons would have needed to be elected in order for the 111th Congress to reflect the percentage of Americans who are Hispanic?
3. The number of Black House of Representatives members increased by 23.8% from the 111th to the 116th Congress. How many Black House of Representative members were there in the 116th Congress?

Unit 7.4, Practice Day 2: Worksheet

Name _____

Fix It!

Problem A

1. Explain the error.
2. Calculate the correct solution.

Problem B

1. Explain the error.
2. Calculate the correct solution.

Problem C

1. Explain the error.
2. Calculate the correct solution.

Ice Cream

- 1.
- 2.
- 3.



Unit 7.4, Practice Day 2: Worksheet

Name _____

Everything On Sale!

- 1. _____
- 2. _____
- 3. _____

Up and Down

- 1.1 _____
- 2. _____
- 3. _____

1.2 _____

Government

- 1. _____
- 2. _____
- 3. _____

Unit 7.4, Practice Day 2: Practice Problems

Name _____

Warm-Up

Jamar walks $\frac{1}{2}$ of a mile in $\frac{1}{4}$ of an hour. What is his speed in miles per hour?

Practice: The Middle of the Story

In this practice set, you will see problems (beginnings) and correct solutions (ends). Your task is to explain all of the parts in the middle.

Problem 1

A watermelon weighs 6 255 grams.

A scale measures the weight as 6 475 grams. What is the scale's percent error?

Solution

3. 5% error

The Middle of the Story

Explain how to go from the problem to the solution.

Problem 2

The cost of a toy truck is \$36. 50 before tax. The store adds a 6% sales tax. Then, the customer uses a 10% discount coupon.

How much will the customer pay for the truck?

Solution

\$34. 82

The Middle of the Story

Explain how to go from the problem to the solution.

**Unit 7.4, Practice Day 2: Practice Problems****Problem 3**

The minimum wage in a particular city is \$8.40 per hour. The city decides to raise the minimum wage by 2.5% each year.

- 3.1 What will the minimum wage in this city be in two years?
- 3.2 When will the minimum wage be over \$10 per hour?

Solution

- 3.1 \$8.83 per hour
- 3.2 In 8 years

The Middle of the Story

Explain how to go from the problem to the solution.

Reflect

1. Write 1–2 big ideas from this unit that you think are important to understand.

2. Name one strategy in this unit that you found particularly useful, and explain why it was useful to you. Also, if you learned it from another student, give that student credit.

GRADE 7

Unit 6

Student Lessons

Student lessons from Unit 6 are included here to provide NYC reviewers with access to the specific lessons in Amplify Desmos Math New York that demonstrate coverage of the **Expressions, Equations, and Inequalities** domain.

These lessons are partially designed and will be updated to match the exemplar Student Edition lessons included earlier in this sampler.

The background features a light purple color palette with various geometric elements: solid lines, dashed lines, squares, diamonds, and circles. Some lines are curved at the ends. There are also soft, light blue cloud-like shapes scattered across the page. Two horizontal purple lines are positioned above and below the main title.

Grade 7 Unit 6

Student Edition Sampler



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

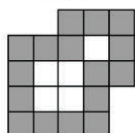
Unit 7.6, Lesson 1: Notes

Name _____

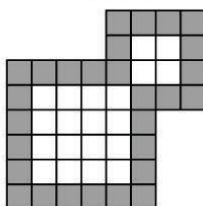
My Notes

Here is a pattern. The tiles around the edge are called border tiles.

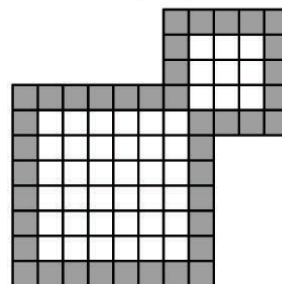
Stage 1



Stage 2



Stage 3



1. Enter the missing information in the table.
2. Predict how many border tiles are used in Stage 4. Explain how you know.

Stage	Border Tiles
1	16
2	28
3	

3. Will there be a stage with 100 border tiles? Explain.

Summary

I can use patterns to determine unknown values.



Unit 7.6, Lesson 1: Practice Problems

Maneli and Santiago are trying to solve the equation $\frac{2}{3} + x = \frac{1}{3}$.

- Maneli says, “I think we should multiply each side by $\frac{3}{2}$ because that is the reciprocal of $\frac{2}{3}$.”
- Santiago says, “I think we should add $-\frac{2}{3}$ to each side because that is the opposite of $\frac{2}{3}$.”

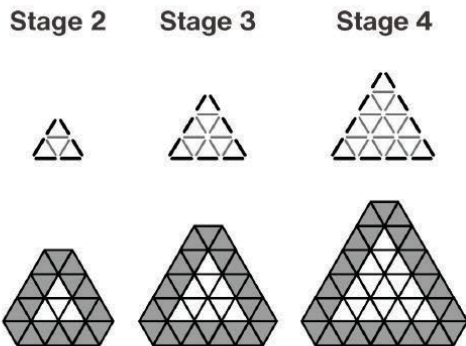
2.1 Which person’s strategy should they use? _____ Why?

2.2 Write an equation that can be solved using the other person’s strategy.

Explore

Here are scaled copies of the same figure. The top three have a toothpick border and the bottom three have a tile border.

Complete the table to show the number of toothpicks and tiles for different stages.



Stage	Border Toothpicks	Border Triangles
2		
3		
4		
5		
6		

Reflect

1. Draw a star next to your favorite question on this worksheet.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 2: Notes

Name _____

My Notes

Aba bought a loaf of bread and some apples. Her receipt is below.

Bread	(1 @ \$2.25)	\$2.25
Apples	(3 @	\$
Total:		\$6.00

1.1 Which tape diagram represents the receipt?

Diagram A

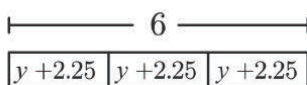
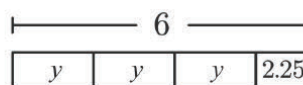
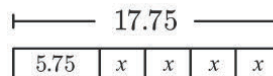


Diagram B



1.2 What is the price of an apple?

2. Tell a story that this diagram could represent.



Summary

- I can connect a tape diagram to a story.
- I can use a tape diagram to figure out an unknown value.



Unit 7.6, Lesson 2: Practice Problems

Name _____

Warm-Up

Determine the value of the variable that makes each equation true.

$8.5 \cdot (-3) = a$

$(-7) + b = -11$

$c - (-3) = 15$

$d \cdot (-4) = 32$

Practice

Solve each equation.

1.1 $2x = 10$

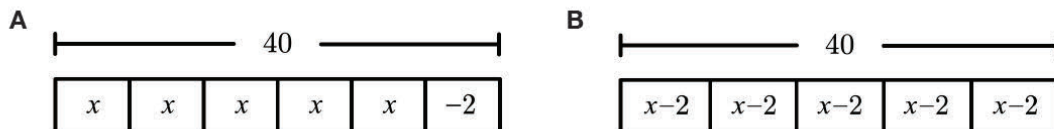
1.2 $-3x = 21$

1.3 $\frac{1}{3}x = 6$

1.4 $-\frac{1}{2}x = -7$

Axel wants to save \$40 to buy a gift for his friend. His neighbor pays him weekly to mow the lawn, and he donates \$2 of what he earns each week to charity. Axel calculates that it will take him 5 weeks to earn enough for his friend's gift.

2.1 Which tape diagram represents this situation?

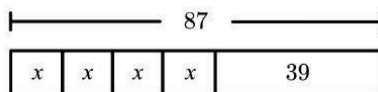


2.2 Explain how the parts of the tape diagram represent the story.

2.3 How much does Axel's neighbor pay him each week to mow the lawn?

Unit 7.6, Lesson 2: Practice Problems

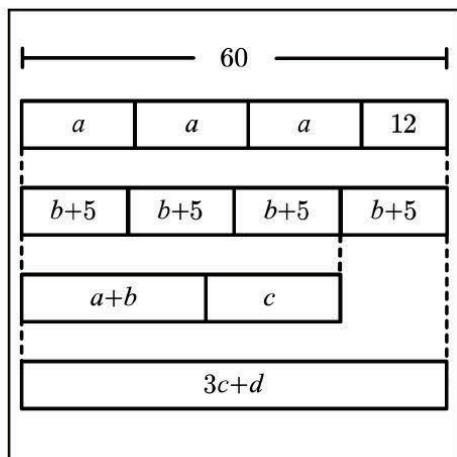
3. Select **all** the stories that the tape diagram can represent.



- There are 87 first graders in school. After 39 students are picked up, the teachers put the remaining students into 4 groups for an activity.
- Latifa buys a pack of 87 pencils. She gives 39 to her teacher and shares the remaining pencils between herself and 3 friends.
- Emiliano buys 4 packs of paper clips with 39 paper clips in each. Then he gives 87 paper clips to his teacher.
- Shanice's family buys 4 tickets to a fair and spends \$39 on dinner. They spend \$87 total.

Explore

Determine the values of a , b , c , and d .



Variable	Value
a	
b	
c	
d	

Reflect

- Put a smiley face next to the question you spent most time on.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 3: Notes

Name _____

My Notes

A drive-in movie theater charges \$6.00 per car, plus a fee for each person in the car. A family of 3 came in one car and paid \$22.50 total.

1. Select the tape diagram that best matches this situation.

Diagram A

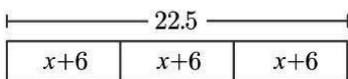
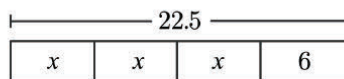


Diagram B



2. Write an equation to represent this situation.
3. How much was the fee for each family member?
4. Describe how you can tell from the tape diagram that your solution makes sense.
5. Describe how you can tell from the equation that your solution makes sense.

Summary

I can connect tape diagrams, equations, and stories.

I can write an equation to represent a tape diagram or a story.

Unit 7.6, Lesson 3: Practice Problems

Name _____

Warm-Up

Determine the value of each expression.

$(100) \cdot (-0.09)$

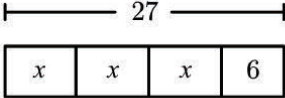
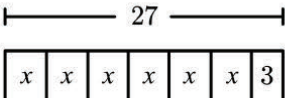
$(-7) \cdot (-1.1)$

$(-7.3) \cdot (5)$

$(-0.2) \cdot (-0.3)$

Practice

Here are two stories, two tape diagrams, and two equations.

<p>Story #1: A family buys 6 tickets to a show. They also pay a \$3 parking fee. They spend \$27 total.</p> <p>Story #2: Diego has 27 ounces of juice. He pours equal amounts for each of his 3 friends and has 6 ounces left for himself.</p>	<p>A.</p>  <p>B.</p> 	<p>$3x + 6 = 27$</p> <p>$6x + 3 = 27$</p>
--	--	---

	Story #1	Story #2
<p>1.1 Decide which tape diagram and equation represents each story.</p>	<p>Tape diagram: _____</p> <p>Equation: _____</p>	<p>Tape diagram: _____</p> <p>Equation: _____</p>
<p>1.2 What does x represent in each equation?</p>		
<p>1.3 Determine the value of x. Explain or show your reasoning.</p>		
<p>1.4 What does each solution tell you about its story?</p>		

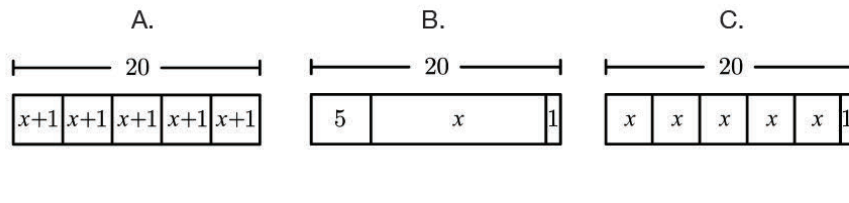


Unit 7.6, Lesson 3: Practice Problems

Match each equation with a tape diagram.

2.1 $5(x + 1) = 20$

2.2 $5x + 1 = 20$

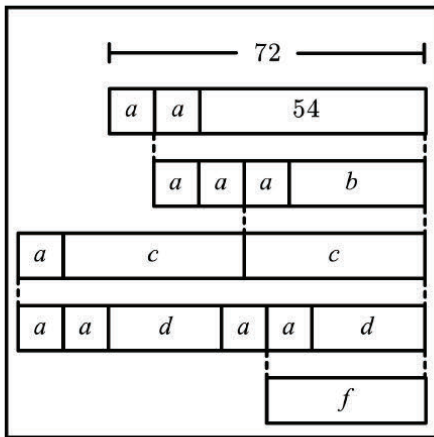


Determine the number of miles each car can travel in 1 hour assuming they drive at a constant speed.

3.1 135 mi. in 3 hr. 3.2 22 mi. in $\frac{1}{2}$ hr. 3.3 7.5 mi. in $\frac{1}{4}$ hr. 3.4 $97\frac{1}{2}$ mi. in $\frac{3}{2}$ hr.

Explore

Determine the value of each variable.



Variable	Value
a	
b	
c	
d	
f	

Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 4: Seeing Structure

Name(s) _____

Warm-Up

A. $100 = 8(x + 9)$	D. $9x + 63 = 100$
B. $9(x + 7) = 100$	E. $100 = 72 + 8x$
C. $100 = 8x + 72$	F. $(x + 7) \cdot 9 = 100$

1. Select two equations that have something in common. How are the two equations alike?

2. Create two groups so that the equations in each group have something in common.

Group 1 equations: _____

(List the letters representing the equations.)

All the equations in this group . . .

Group 2 equations: _____

(List the letters representing the equations.)

All the equations in this group . . .

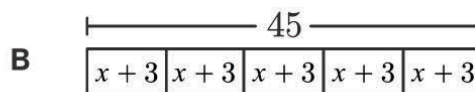
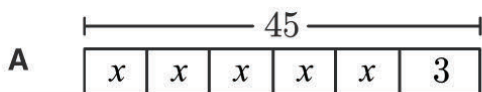


Unit 7.6, Lesson 4: Seeing Structure

Name(s) _____

Activity 1: Which Diagram?

For each situation, choose the diagram that best represents it. Then write an equation, determine the solution, and explain what the solution means in the situation.



1. A postal worker weighs 5 identical cardboard packages and a 3-pound plastic box. Altogether, they weigh 45 pounds.

Which diagram?

A or B

Equation

Solution

Meaning of Solution

2. Tyani is making 5 gift bags. Each bag contains x pencils. Tyani adds 3 more pencils to each bag. Altogether, the gift bags contain 45 pencils.

Which diagram?

A or B

Equation

Solution

Meaning of Solution

3. A national park charges \$3 for each car that enters and also a fee for each person that enters. A family of 5 enters the park in 1 car and pays a total of \$45.

Which diagram?

A or B

Equation

Solution

Meaning of Solution

Activity 2: Write Your Own

Natalia's family wants to inflate a total of 60 balloons for a party. Yesterday, they inflated 24 balloons. Today, they want to split the remaining balloons equally between 4 family members.

- 1.1 Write a question that you could figure out using this information and whose answer is not already given.

- 1.2 Answer the question you wrote above. Make a tape diagram if it is helpful.

- 1.3 Write an equation for this situation and use it to check your solution.

An art class charges each student \$15 to attend, plus a fee for supplies. The instructor hopes to collect \$240 total from the 12 students who attend the class.

- 2.1 Write a question that you could figure out using this information and whose answer is not already given.

- 2.2 Answer the question you wrote above. Make a tape diagram if it is helpful.

- 2.3 Write an equation for this situation and use it to check your solution.

Are You Ready for More?

Write your own problem that can be solved with a tape diagram. Then swap problems with a classmate and solve your classmate's problem.



Unit 7.6, Lesson 4: Notes

Name _____

My Notes

- Deiondre bought a juice for \$3 and 2 sandwiches that cost x dollars each. Altogether, the items cost \$11.50. Complete each section below.

Tape Diagram	Equation
Solution	Meaning of Solution

- Describe the similarities and differences between the tape diagrams of the equations below.

$$2x + 3 = 11.5$$

$$2(x + 3) = 11.5$$

Similarities:

Differences:

Summary

<input type="checkbox"/> I can connect a situation to a tape diagram, equation, and solution. <input type="checkbox"/> I can write an equation to represent a situation and use a tape diagram to answer a question about it.
--

Unit 7.6, Lesson 4: Practice Problems

Name _____

Warm-Up

Determine the value of each expression.

$\frac{2}{3} \cdot \left(\frac{-4}{5}\right)$

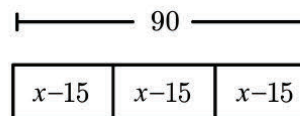
$\left(\frac{-5}{7}\right) \cdot \left(\frac{7}{5}\right)$

$\left(\frac{-2}{39}\right) \cdot 39$

$\left(\frac{2}{5}\right) \cdot \left(\frac{-3}{4}\right)$

Practice

1. A school ordered 3 large boxes of markers. After giving 15 markers to each of 3 teachers, there were 90 markers left. The diagram represents the situation.



How many markers were originally in each box?

Here are two stories and two equations.

<p>Story #1: A family buys 6 tickets to a show. They also each spend \$3 on a snack. They spend \$24 total.</p> <p>Story #2: Amir has 24 ounces of juice. He pours equal amounts for each of his 3 friends and then adds 6 more ounces for each.</p>	<p>A. $3(x + 6) = 24$</p> <p>B. $6(x + 3) = 24$</p>
--	---

	Story #1	Story #2
2.1 Decide which equation represents each story.		
2.2 What does x represent in each equation?		
2.3 Solve each equation. Draw a tape diagram if it helps you with your thinking.		
2.1 What does each solution tell you about its story?		



Unit 7.6, Lesson 4: Practice Problems

For each equation, draw a tape diagram and find the solution to the equation.

3.1 $6x + 11 = 21$

3.2 $6(x + 1) = 24$

Explore

Each of the tape diagrams are the same length.

Write an equation for each tape diagram and find the solution to the equation.

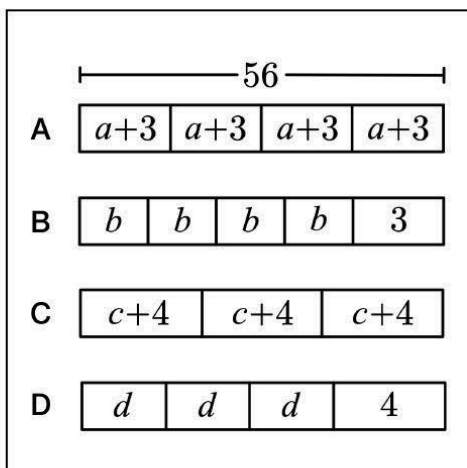


Diagram	Equation	Solution
A		
B		
C		
D		

Reflect

- Put a smiley face next to the question you spent most time on.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 5: Notes

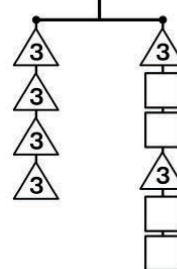
Name _____

My Notes

- Complete the table so Hanger A stays balanced.

Weight of Triangle (lb.)	Weight of Square (lb.)
3	

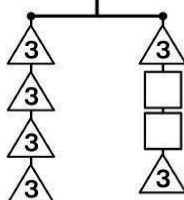
Hanger A



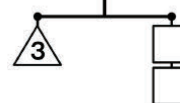
- Describe how you figured out the weight of each square.

- If Hanger A is balanced, which of these hangers will also be balanced?

Hanger B



Hanger C



- Explain how you know.

Summary

- I can figure out an unknown value in a hanger diagram and explain my strategy.
- I can make moves to keep a hanger balanced.



Unit 7.6, Lesson 5: Practice Problems

Name _____

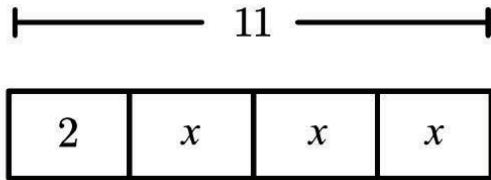
Warm-Up

Select all of the expressions equivalent to $2(x + 3)$.

- $2 \cdot (x + 3)$
- $(x + 3) \cdot 2$
- $2 \cdot x + 2 \cdot 3$
- $2x + 3$
- $(2 \cdot x) + 3$

Practice

1.1 Select all of the equations that match the tape diagram.

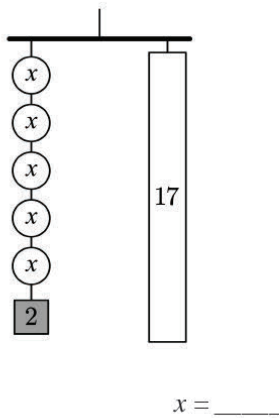


- $11 = 2 + 3x$
- $3x + 2x = 11x$
- $3 + 2x = 11$
- $11 - 2 = 3x$
- $11 = 2 + x + x + x$
- $2x + 3 = 11$

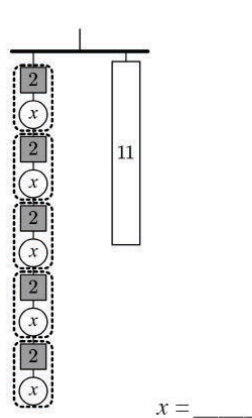
1.2 Draw a tape diagram that matches one of the equations you did not select in Problem 1.1.

Determine the value of x so that each hanger stays balanced.

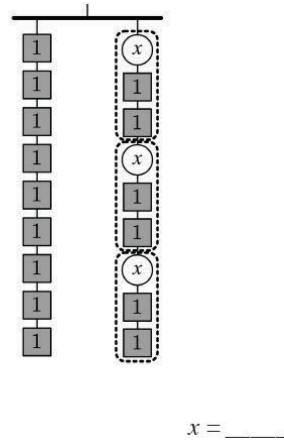
2.1



2.2



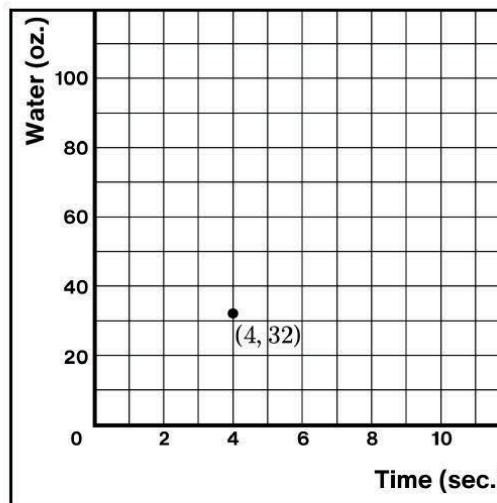
2.3



Unit 7.6, Lesson 5: Practice Problems

Water runs from a faucet into a bucket at a steady rate. After 4 seconds, there are 32 ounces of water in the bucket.

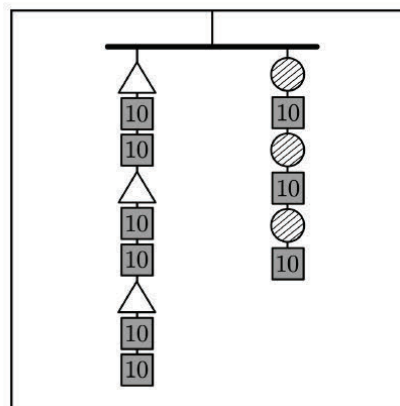
- 3.1 What is the constant of proportionality in this relationship?
- 3.2 What does the constant of proportionality mean in this situation?
- 3.3 Add at least three more points to the graph and label their coordinates.
- 3.4 Write an equation that shows the relationship between time and ounces of water. Use t for time in seconds and w for ounces of water.



Explore

The weight of the square is 10 grams.
How much heavier is the circle than the triangle?

Show or explain your reasoning.



Reflect

1. Put a star next to the question you are most proud of answering.
2. Use the space below to ask one question you have or to share something you are proud of.



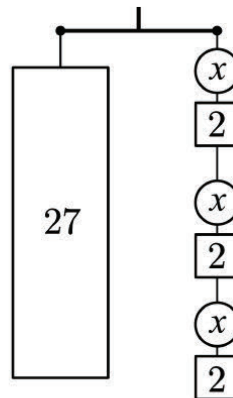
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 6: Notes

Name _____

My Notes

1.1 What is the value of x ?



Anand and Darius used equations to figure out the value of x .

Anand
 $27 = 3(x + 2)$
 $9 = x + 2$

Darius
 $27 = 3x + 6$
 $21 = 3x$

1.2 Why did Anand write $9 = x + 2$?

1.3 Why did Darius write $21 = 3x$?

2. What is the value of x in the equation $4x + 11 = 14$?

Summary

- I can connect balancing moves on hangers to solving equations.
- I can solve equations with positive numbers.

Warm-Up

Mentally determine the value of x that makes each equation true.

$(x - 1) = 5$

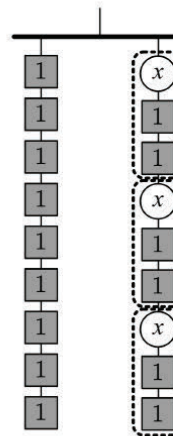
$2(x - 1) = 10$

$3(x - 1) = 15$

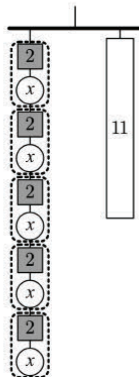
$500 = 100(x - 1)$

Practice

1. Explain how each part of $9 = 3(x + 2)$ is represented in the hanger.



- 2.1 Write an equation that represents this hanger.



- 2.2 What is the value of x that makes the equation true?

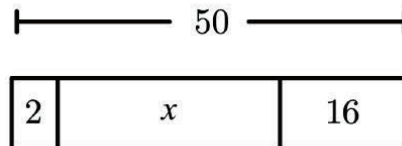
- 3.1 Draw a hanger that represents the equation $12.7 = 3x + 0.7$.

- 3.2 What is the value of x that makes the equation true?



Unit 7.6, Lesson 6: Practice Problems

Hailey drew this diagram to represent the equation $2x + 16 = 50$, but she made a mistake.



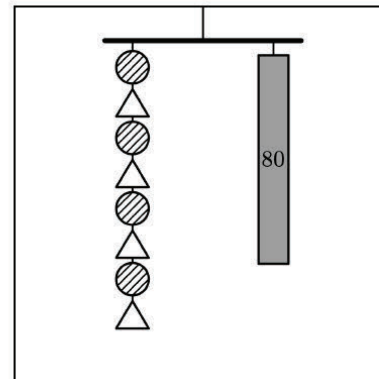
- 4.1 Explain the mistake Hailey made.
- 4.2 What equation does Hailey's tape diagram represent?
- 4.3 Make a new diagram that correctly represents the equation.
- 4.4 Use the new diagram to determine the correct value of x .

Explore

The weight of the rectangle is 80 grams.
The weight of the triangle is double the weight of the circle.

Determine the weight of the circle.

Explain or show your reasoning.



Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

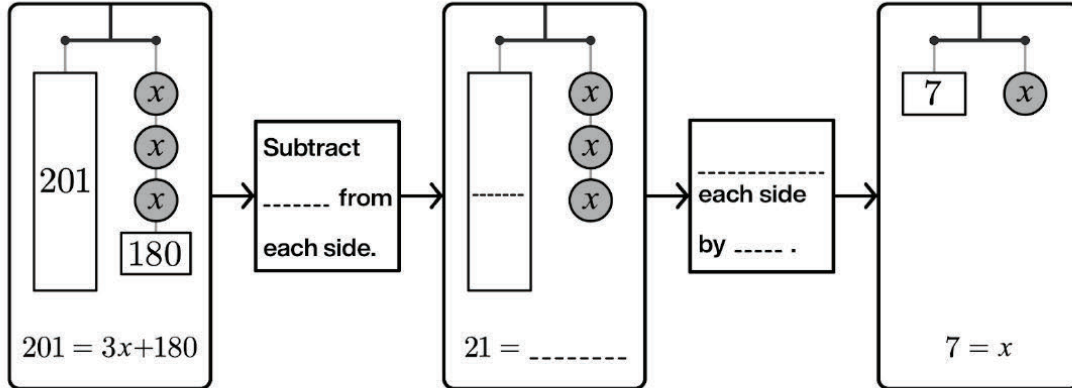
Unit 7.6, Lesson 7: Keeping It True

Name(s) _____

Activity 1: Keep It True

Solve each equation by filling in the blanks in the hangers, equations, and descriptions.

1.



2.

$$5 = 2x + 8$$

each side.

$$\text{-----} = 2x$$

each side -----

$$\text{-----} = x$$

3.

$$2(x - 5) = -6$$

each side -----

$$x - 5 = -3$$

$$\text{-----} = \text{-----}$$

4. How could you check that the solutions to the equations in Problems 1–3 are correct?



Unit 7.6, Lesson 7: Keeping It True

Name(s) _____

Activity 2: Less and More Difficult

Look through the equation cards. Without solving, select three equations that you think would be **less difficult to solve** and three equations that you think would be **more difficult to solve**.

Less Difficult to Solve

More Difficult to Solve

Explain how you decided which equations would be more difficult to solve.

Activity 3: Solve 'em

Select four equations to solve. At least one should be from your "less difficult" list and one should be from your "more difficult" list. Show or explain your reasoning for each equation.

Card ____

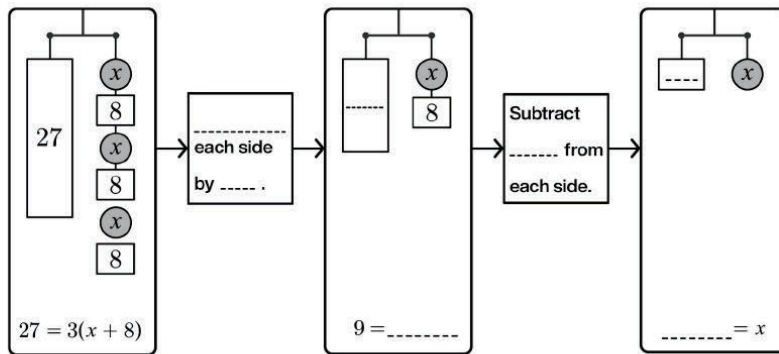
Card ____

Card ____

Card ____

My Notes

1. Solve each equation by filling in the blanks.



Solve each equation and show your reasoning.

2.1 $-4x + 3 = 23$

2.2 $-3(x - 7) = 33$

Summary

I can solve equations with positive and negative numbers and explain my strategy.

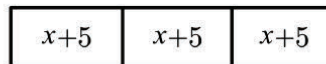


Unit 7.6, Lesson 7: Practice Problems

Name _____

Warm-Up

Select all of the expressions represented by the tape diagram.



- $3(x+5)$ $3(x+15)$ $x+x+x+5+5+5$
- $(x+5) \cdot 3$ $15+3x$ $3x+5$

Practice

Solve each equation by filling in the blanks.

- 1.1 $15x - 10 = 65$ 1.2 $3(x+7) = -12$ 1.3 $-100x - 100 = 0$

- $15x = \underline{\hspace{2cm}}$ $x+7 = \underline{\hspace{2cm}}$ $-100x = \underline{\hspace{2cm}}$

- $x = \underline{\hspace{2cm}}$ $x = \underline{\hspace{2cm}}$ $x = \underline{\hspace{2cm}}$

Solve each equation.

- 2.1 $-4x = -28$ 2.2 $-4(x+1) = -28$ 2.3 $x+7 = -1$ 2.4 $-3x+7 = -1$

Match each story to an equation.

- 3.1 A stack of nested paper cups is 8 inches tall. The first cup is 4 inches tall and each of the rest of the cups in the stack adds $\frac{1}{4}$ inch to the height of the stack.
 - 3.2 A baker uses 4 cups of flour. She uses $\frac{1}{4}$ cup to flour the counters and the rest to make 8 muffins.
 - 3.3 Mariana has an 8-foot piece of ribbon. She cuts off a piece that is $\frac{1}{4}$ of a foot long and cuts the remainder into four equal pieces.
- A. $\frac{1}{4} + 4x = 8$
 - B. $4 + \frac{1}{4}x = 8$
 - C. $8x + \frac{1}{4} = 4$

Unit 7.6, Lesson 7: Practice Problems

There are 88 seats in a theater. The seating in the theater is split into 4 identical sections. Each section has 14 red seats and some blue seats.

- 4.1 Draw a tape diagram or hanger to represent the situation.

- 4.2 Write an equation to represent the situation.

- 4.3 Describe what x represents in this situation.

Explore

Using the digits 0–9, fill in the blanks so that the values of x are as great as possible. You cannot use the same digit in both equations.

Equation 1		Equation 2
$\square x - \square = \square$		$\square(x - \square) = \square$

Challenge: Can you fill in each blank so that these equations have the same value for x ?

Reflect

1. Circle the question you understand best.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 8: Factoring and Expanding

Name(s) _____

Activity 1: Factoring Puzzles

Complete the missing information in each puzzle.

Puzzle 1

a	-6
-----	------

5

-----	-----

Factored	Expanded
$5(a - 6)$	_____

Puzzle 2

-----	-----
-------	-------

2

$6a$	$-2b$
------	-------

Factored	Expanded
_____	$6a - 2b$

Puzzle 3

--	--

Factored	Expanded
_____	$-25x + 15$

Puzzle 4

Factored	Expanded
$-(2c + 3)$	_____

Activity 2: Step by Step by Step by Step

Here is an equation and the first steps that Sadia and Amir wrote to solve it.

Sadia

$$2(x - 9) = 10$$

$$x - 9 = 5$$

Amir

$$2(x - 9) = 10$$

$$2x - 18 = 10$$

1. Are each of their first steps correct? Explain your reasoning.

2. Finish solving each equation.

Activity 3: Different First StepsSolve these equations for x using both methods. Check the box when your solutions match.

1.

$$3(x + 2) = 21$$

Expand First

Divide First

2.

$$200(x - 0.3) = 600$$

Expand First

Divide First

3.

$$-10(x - 1.7) = -3$$

Expand First

Divide First



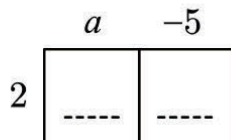
Unit 7.6, Lesson 8: Notes

Name _____

My Notes

1. Complete the missing information in each puzzle.

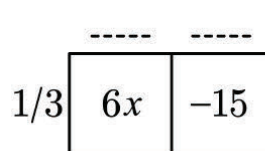
Puzzle 1



Factored: $2(a - 5)$

Expanded: _____

Puzzle 2



Factored: _____

Expanded: $6x - 15$

2.1 List two different first steps you could take to solve the equation $5(x - 1) = 55$.

2.2 Dyani solved the equation below.

$$5(x - 1) = 55$$

$$5x - 5 = 55$$

$$5x = 60$$

$$x = 12$$

What was their first step?

2.3 Solve the equation $5(x - 1) = 55$ using a different first step.

Summary

- I can expand and factor expressions.
- I can solve equations that involve expanding.
- I can compare different strategies for solving the same equation.

Unit 7.6, Lesson 8: Practice Problems

Name _____

Warm-Up

Write each expression in expanded form.

$-2(-6)$

$-2(-y)$

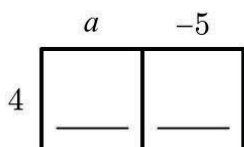
$-2(-6 + -y)$

$-2(-6 - y)$

Practice

Complete the missing information in each puzzle.

1.1

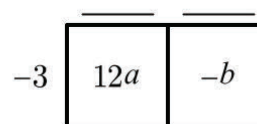


Factored

$4(a + -5)$

Expanded

1.2



Factored

Expanded

$12a - b$

1.3



Factored

Expanded

$9x - 21$

1.4

Factored

$-(3c + 8)$

Expanded

Solve each equation.

2.1 $2(x - 3) = 14$

2.2 $-5(x - 1) = 40$

2.3 $10x + 2 = 24$

2.4 $\frac{1}{6}(x + 6) = 11$



Unit 7.6, Lesson 8: Practice Problems

Emmanuel and Mauricio are solving the equation $7(x - 2) = 91$.

3.1 Finish solving each equation.

Emmanuel

$$7(x - 2) = 91$$

$$7x - 14 = 91$$

Mauricio

$$7(x - 2) = 91$$

$$x - 2 = 13$$

3.2 What is similar and what is different about their strategies?

Use long division to write each fraction as a decimal.

4.1 $\frac{2}{5}$

4.2 $\frac{2}{6}$

4.3 $\frac{2}{11}$

Explore

Using the digits 0–9, fill in the blanks so that the values of x are as great as possible. You cannot use the same digit in both equations.

Equation 1

$$\square x - \square = \square$$

Equation 2

$$\square(x - \square) = \square$$

Reflect

- Put a smiley face on the question you spent the most time on.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

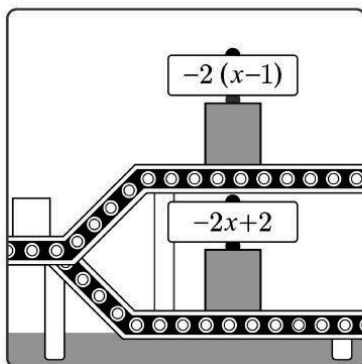
Unit 7.6, Lesson 9: Notes

Name _____

My Notes

1. Describe what an *equivalent expression* is in your own words.

Here are two number machines.



2.1 When will these number machines have equal outputs?

Always / Sometimes / Never

2.2 Explain your thinking.

3. Select **all** of the expressions equivalent to $10 - 25x$.

- $25x - 10$
- $5(2 - 5x)$
- $-25x + 10$
- $25x + (-10)$
- $-5(5x - 2)$

4. Write an equivalent expression for $-4x + 14$.

Summary

- I can write equivalent expressions.
- I can explain whether or not two expressions are equivalent.



Unit 7.6, Lesson 9: Practice Problems

Name _____

Warm-Up

Determine the value of each expression.

$-30 \cdot -10$

$-10 + -30$

$-30 - 10$

$10 - (-30)$

Practice

1. Alejandro says that $10x + 6$ and $5x + 11$ are equivalent because they equal 16 when x is 1.

Do you agree with Alejandro?

Explain your reasoning.

- 2.1 Write at least three different expressions that are equivalent to:

$16a - 24$

- 2.2 Write at least three different expressions that are equivalent to:

$\frac{-1}{2}(-12x + 30)$

Write an equivalent expression in expanded form. If you get stuck, consider drawing boxes to help organize your work.

3.1 $8(-x + \frac{1}{4})$

3.2 $-2(-6x - 1)$

3.3 $\frac{1}{5}(20y - 13)$

3.4 $9(4x + 3y + \frac{2}{3})$

Unit 7.6, Lesson 9: Practice Problems

The output from different power plants in megawatts (MW) are shown in the tables.

Coal Power Plant

Energy (MW)	Number of Days
1 200	2.4
1 800	3.6
4 000	8
10 000	20

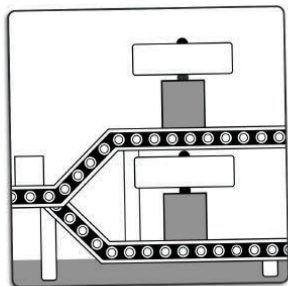
Solar Power Plant

Energy (MW)	Number Of Days
100	1
650	4
1 200	7
1 750	10

- 4.1 For the coal power plant, is the energy output proportional to the number of days? Use E to represent energy and d to represent the number of days.
- If yes, write an equation showing the relationship. If not, explain your reasoning.
- 4.2 For the solar power plant, is the energy output proportional to the number of days? Use E to represent energy and d to represent the number of days.
- If yes, write an equation showing the relationship. If not, explain your reasoning.

Explore

Here is a never-equal machine. Write two expressions that will never return the same output.



Show or explain how you know your two expressions will never return the same output.

Reflect

1. Put a heart next to the question you found most interesting to complete.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 10: Notes

Name _____

My Notes

1. How many **terms** does the expression $5x - 10 + 3x + 6$ have? Explain how you know.

2. Mai collected the squares by adding across each row. Write each of her sums using the fewest number of terms.

$5(x - 2)$	$3x + 6$
$-11x$	$-3(x + 2)$

Top sum:

Bottom sum:

3. Ayaan collected the squares by adding down each column. Write each of his sums using the fewest number of terms.

$5(x - 2)$	$3x + 6$
$-11x$	$-3(x + 2)$

Left sum:

Right sum:

Summary

I can write equivalent expressions with fewer terms.

Warm-UpSelect **all** of the expressions that are equivalent to $4x - 5 + 6$.

- $4x + (-5) + (6)$
 $4x - 6 + 5$
 $4x + 1$
 $5x$
 $5 + 6 - 4x$

Practice

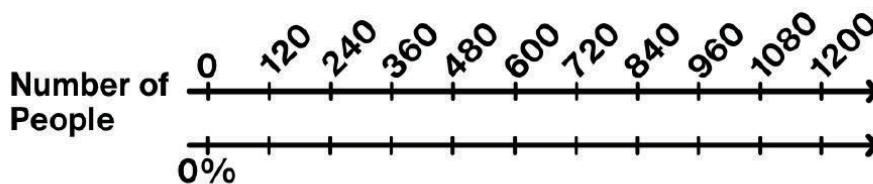
Solve each equation.

1.1 $5(n-4) = -60$	1.2 $-3t + (-8) = 25$	1.3 $7p - 8 = -22$	1.4 $\frac{2}{5}(j + 40) = -4$
--------------------	-----------------------	--------------------	--------------------------------

Fill in the blanks to make each equation true.

2.1 $6x + \underline{\hspace{2cm}} = 10x$	2.2 $6x + \underline{\hspace{2cm}} = 2x$	2.3 $6x + \underline{\hspace{2cm}} = -10x$	2.4 $6x + \underline{\hspace{2cm}} = 10x + 5$
2.5 $6x - \underline{\hspace{2cm}} = 2x$	2.6 $6x - \underline{\hspace{2cm}} = x$	2.7 $6x + \underline{\hspace{2cm}} = 10$	2.8 $6x - (\underline{\hspace{2cm}}) = 4x - 10$

3. A small town had a population of 960 people last year. The population grew to 1 200 people this year. By what percentage did the population grow?

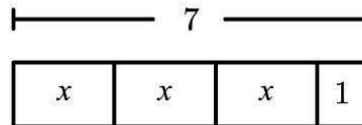




Unit 7.6, Lesson 10: Practice Problems

This diagram can be represented by the equation $7 = 3x + 1$.

- 4.1 Explain where you can see the 3 in the diagram.



- 4.2 Determine the value of x .

- 4.3 Select **all** the stories that could be represented by this equation.

- Aaliyah is studying 7 hours this week for end-of-year exams. She spends 1 hour on English and an equal number of hours each on math, science, and history.
- Lan spends \$3 on 7 markers and a \$1 pen.
- Sneha shares 7 grapes with 3 friends. She eats 1 and gives each friend the same number of grapes.

Explore

Fill in each blank with a number or expression such that each row and column has the same sum.

	$x+2$	$2-x$
$5-x$	x	
	2	

Reflect

- Circle the question you feel most confident about.
- Use the space below to ask one question you have or to share something you are proud of.



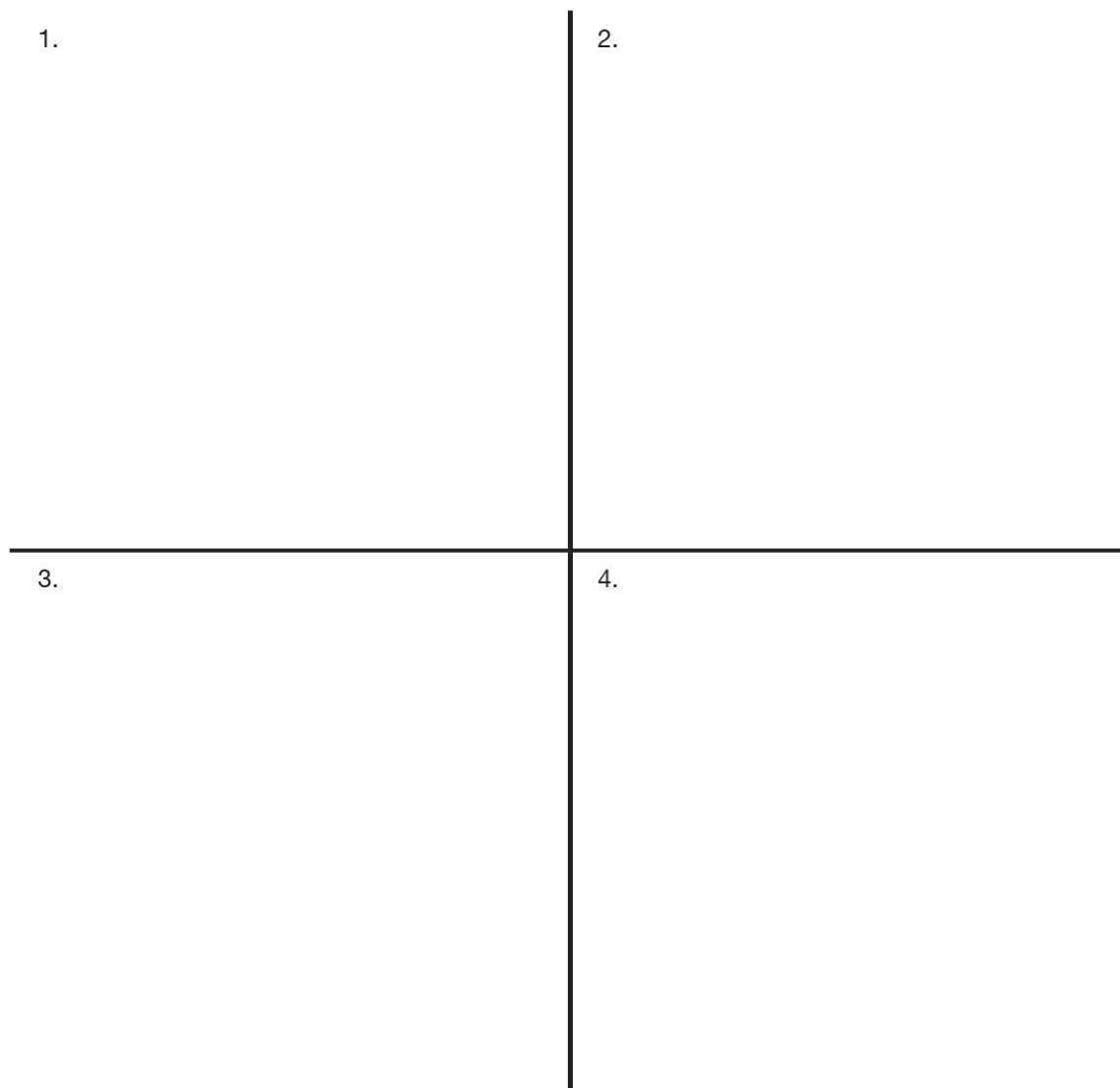
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 11: Equation Roundtable

Name _____

Activity 1: Roundtable

Set 1



Reflection

What advice would you give to yourself or others when solving these types of equations?



Unit 7.6, Lesson 11: Equation Roundtable

Name _____

Set 2

5.

6.

7.

8.

Unit 7.6, Lesson 11: Notes

Name _____

My Notes

- 1.1 Hamza wrote several steps to solve the equation below. Describe each of the steps in words. The first is done for you.

$$-2 + 6(3x - 5x) = 46$$

$$6(3x - 5x) = 48 \quad \text{Add 2 to each side.}$$

$$6(-2x) = 48 \quad \underline{\hspace{2cm}}$$

$$-12x = 48 \quad \underline{\hspace{2cm}}$$

$$x = -4 \quad \underline{\hspace{2cm}}$$

- 1.2 What are some other first steps Hamza could have taken to solve the equation $-2 + 6(3x - 5x) = 46$?

2. Solve the equation $12 - 2(x - 3) = -8$.

Summary

- | |
|---|
| <p><input type="checkbox"/> I can add and expand expressions to help me solve equations.</p> <p><input type="checkbox"/> I can compare and contrast different strategies for solving the same equation.</p> |
|---|

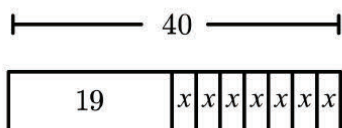


Unit 7.6, Lesson 11: Practice Problems

Name _____

Warm-Up

Write three different equations that represent the tape diagram.



1.

2.

3.

Practice

1. Select
- all**
- the statements that are true for any value of
- x
- .

$7x + (2x + 7) = 9x + 7$

$3x + (10 - 3x) = 10$

$4x - (2x + 8) = 2x - 8$

$7x + (2x - 1) = 9x + 1$

$5x - (8 - 6x) = -x - 8$

$6x - (2x - 4) = 4x + 4$

Here is Josiah's work writing the expression $2x - \frac{1}{2}(10 - 4x)$ using fewer terms.

- 2.1 Describe the mistake that Josiah made.

- 2.2 Write an expression equivalent to
- $2x - \frac{1}{2}(10 - 4x)$
- that has two terms.

Josiah's Strategy

$$2x - \frac{1}{2}(10 - 4x)$$

$$2x + \left(-\frac{1}{2}\right)(10 - 4x)$$

$$2x + (-5) - 2x$$

$$-5$$

3. Vicente and Zwen are trying to write $9x - 2x + 4x$ using fewer terms.
- Vicente says that $9x - 2x + 4x = 3x$ because the subtraction sign tells us to subtract everything that comes after $9x$.
 - Zwen says that $9x - 2x + 4x = 11x$ because the subtraction only applies to $2x$.

Do you agree with either of them?

Explain your reasoning.

Unit 7.6, Lesson 11: Practice Problems

4.1 Plot these points on the coordinate plane.

$$A = (3, 2)$$

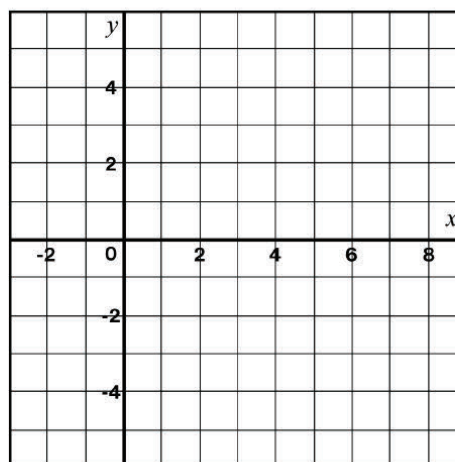
$$B = (7.5, 2)$$

$$C = (7.5, -2.5)$$

$$D = (3, -2)$$

4.2 What is the vertical change from A to D ?

4.3 Write an expression that represents the vertical change from C to B .



Explore

Fill in each blank with a number or expression such that each row and column adds up to the same total.

$8-3x$			
$2x-3$	3	$2-x$	x
$1-2x$	$4x-1$	$3x-2$	
	$6-5x$		$6x-7$

Reflect

- Put a smiley face next to the question you learned from most while you were working on it.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 12: Community Day

Name _____

Activity 1: Three Reads

Kyrie is making ■ invitations to their school's Community Day.

They have already made ■ invitations, and they want to finish the rest of them within a week.

Kyrie plans to spread out the remaining work so that they make the same number of invitations each day.

1. With a partner, discuss what this situation is about.
2. Draw a tape or hanger diagram to represent this situation.
3. Given the values your teacher shares, adjust your diagram.
Then use your diagram to figure out how many invitations Kyrie should make each day.

Activity 2: Similar Problems

1. Each set has two related situations. Circle **one** set to explore.

Set 1	<p>A. 6 members of the Martinez family are going to their school's Community Day. They have a coupon for \$4.50 off each ticket. If they pay \$40.50 for all their tickets, how much does one ticket cost without the coupon?</p> <p>B. 6 members of the Benton family are going to their school's Community Day. They have a coupon for \$4.50 off their total. If they pay \$40.50 for all their tickets, how much does one ticket cost without the coupon?</p>
Set 2	<p>A. Kwabena and Trevon are working together tossing bean bags to one side of a scale in order to balance a giant 15 lb. stuffed animal.</p> <p>They're successful after Kwabena tosses 13 bean bags and Trevon tosses 8 bean bags onto the scale. How much does each bean bag weigh?</p> <p>B. Adah and Ivan are working together tossing bean bags to one side of a scale in order to balance a giant 15 lb. stuffed animal.</p> <p>They're successful after Adah tosses 13 small bean bags and Ivan tosses one giant 8-pound bean bag onto the scale. How much does each small bean bag weigh?</p>
Set 3	<p>A. Marquis and Yolanda plan to sell T-shirts at their school's Community Day. They make 25 shirts and each costs \$15 to make. If they would like to make \$320 in profit, how much should they sell each T-shirt for?</p> <p>B. Melissa and Cameron plan to sell T-shirts at their school's Community Day. They spend \$25 on supplies and make 15 shirts. If they would like to make \$320 in profit, how much should they sell each T-shirt for?</p>

2. Create a poster. Here is what your poster should include:

- Your question set.
- Two visual representations, one for each problem (tape diagram, hanger diagram, etc.).
- Two equations with solutions, each representing your chosen diagram and the problem.
- The answer to each of your questions (with units).
- Highlighting that shows the connections between the visual representations, equations, and problems.



Unit 7.6, Lesson 12: Community Day

Name _____

Activity 2 Synthesis

How were your two problems alike? How were they different?	Which representations did you find most useful for answering the questions?
--	---

Activity 3: Gallery Tour

What features of your classmates' posters helped you understand their thinking?	Describe something you would change about your poster now that you have seen other groups' work.
---	--

Activity 4: Revisions and Reflection

1. Use your thinking from the gallery tour to make your poster stronger and clearer.
2. Add to your poster a way to check whether each of your solutions is correct.
3. Individually, answer the questions below.

What clues do you look for in a situation to know what kind of equation might represent it?	How can visual representations and equations help solve problems about a situation?
---	---

Unit 7.6, Lesson 12: Notes

Name _____

My Notes

Use a visual representation or an equation to answer each question.

- 1.1 DeAndre and Valeria are planning a fundraiser for the running club. The decorations cost \$10. If 20 people attend, how much will DeAndre and Valeria need to charge each person to have a final total of \$300 ?

- 1.2 Anika and Rafael are planning a fundraiser to raise money for the soccer team. Each of the 20 people who attend will be served a dinner that costs \$10. How much will Anika and Rafael need to charge each person to have a final total of \$300 ?

- 1.3 For each problem, how were your visual representations or equations similar? How were they different?

Summary

- | |
|---|
| <input type="checkbox"/> I can write and solve equations that represent situations. |
| <input type="checkbox"/> I can connect an equation, a visual, and a description of a situation. |



Unit 7.6, Lesson 12: Practice Problems

Name _____

Warm-Up

Determine the value of the variable that makes each equation true.

$a \cdot 3 = -30$

$-9 \cdot b = -45$

$-89 \cdot 12 = c$

$d \cdot 88 = -88\,000$

Practice

- 1.1 Match each equation to the story it describes.
- 1.2 For each story, answer the question. Explain or show your thinking.

Stories	Equations
<p>A. The temperature outside is currently -7°C. Since midnight, the temperature tripled and then rose 5 degrees.</p> <p>What was the temperature at midnight?</p>	$5x - 7 = 3$
<p>B. Ama has 7 pink roses plus some white roses. She gives all of her roses away by giving 5 roses to each of her 3 favorite teachers.</p> <p>How many white roses does Ama give away?</p>	$7 = 3(5 - x)$
<p>C. A family of 3 goes to a fair. Tickets cost \$5 each, but each person has a coupon. They pay \$7 altogether.</p> <p>How much money does each person save on buying their ticket?</p>	$3x + 5 = -7$
<p>D. A club puts its members into 5 groups for an activity. 7 students leave early, so there are only 3 students left to finish the activity.</p> <p>How many students were in each group?</p>	$(x + 7) = 3 \cdot 5$

Unit 7.6, Lesson 12: Practice Problems

2. Six teams are out on the field playing soccer. Each team has the same number of players. One of the coaches asks for 2 players from each team to go help move some equipment. Now there are 78 players on the field.

Write and solve an equation whose solution is the number of players on each team.

3. Select **all** of the expressions that show x increased by 35%.

$1.35x$ $\frac{35}{100}x$ $x + \frac{35}{100}x$ $(1 + 0.35)x$ $(100 + 35)x$ $\frac{100+35}{100}x$

Explore

Consider the expression $(8x - 9 - 12x + 5)$.

- | | |
|--|---|
| <p>1. Change the position of the parentheses to make a new equivalent expression.</p> <p>Explain how you know they are equivalent.</p> | <p>2. Change the position of the parentheses to make a new expression that is not equivalent to the original. List as many different answers as you can.</p> |
|--|---|

Reflect

- Put a star next to the question you are most proud of on this practice worksheet.
- Use the space below to ask one question you have or to share something you are proud of.



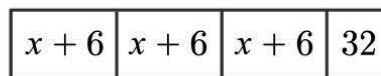
This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Practice Day 1: Worksheet

Name _____

Set A

1. Write an expression equivalent to $7x + 1 - (3x - 1)$ that only has two terms.
2. Write an expression with two terms that represents the diagram.



3. Tameeka’s sunflower is currently 58 millimeters. She notices that the sunflower grows 8 millimeters each day.
Write an expression to represent this situation.

Solve each equation.

4. $8x + 11 = 3$



5. $2(11 - x) = 40$

A bowling alley charges each person \$6 to bowl, plus a shoe rental fee. A group of 4 friends paid \$36 in total.

6.1 Draw a tape diagram to represent this situation.

6.2 How much was the shoe rental fee for each friend?

Unit 7.6, Practice Day 1: Worksheet

Name _____

Kiana delivers sandwiches for a restaurant that charges \$8.25 for each sandwich plus a \$10 delivery fee. Kiana has an order that totals \$59.50.

7.1 Write an equation to describe this situation.

7.2 How many sandwiches are included in this order?

Solve each equation.

8. $\frac{1}{3}(x - 12) = -6$

9. $12 - 3(x + 10) = 18$

A store is having a sale where all shoes are discounted by 20%. Arturo has a coupon for \$3 off the price of one pair of shoes.

The store applies the coupon first and then takes 20% off the reduced price. Arturo pays \$13.60 for a pair of shoes.

10.1 Write an equation to describe this situation.

10.2 What was the original price of the shoes before the sale and the coupon?

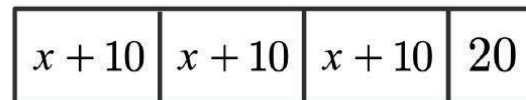


Unit 7.6, Practice Day 1: Worksheet

Name _____

Set B

1. Write an expression equivalent to $11x - 3 - (7x - 5)$ that only has two terms.
2. Write an expression with two terms that represents the diagram.



3. Neena is saving money. She currently has \$58 saved and earns \$8 for every lawn she mows. Write an expression to represent this situation.

Solve each equation.

4. $14x + 20 = 6$

5. $6(3 - x) = 72$

A workout class charges each student \$12 to attend, plus a fee for a towel rental. Today, 5 students paid \$75 to attend the class.

- 6.1 Draw a tape diagram to represent this situation.
- 6.2 How much was the towel rental fee for each student?

Unit 7.6, Practice Day 1: Worksheet

Name _____

Jamar delivers sandwiches for a restaurant that charges \$9.50 for each sandwich plus an \$8 delivery fee. Jamar has an order that totals \$65.

7.1 Write an equation to describe this situation.

7.2 How many sandwiches are included in this order?

Solve each equation.

8. $\frac{1}{4}(x - 6) = -3$

9. $5 - 2(x - 1) = 31$

A store is having a sale where all shoes are discounted by 15%. Xavier has a coupon for \$2 off the price of one pair of shoes.

The store applies the coupon first and then takes 15% off the reduced price. Xavier pays \$15.30 for a pair of shoes.

10.1 Write an equation to describe this situation.

10.2 What was the original price of the shoes before the sale and the coupon?



Unit 7.6, Practice Day 1: Practice Problems

Name _____

Warm-UpWrite as many expressions as you can that are equivalent to $24 - 18x$.**Practice: The Middle of the Story**

In this practice set, you will see problems (beginnings) **and** their solutions (ends).
Your task is to explain all of the parts in the middle.

Problem 1

Solve each equation.

1.1 $5x - 10 = 25$

1.2 $5(x - 10) = 25$

1.3 $5 - (x - 10) = 25$

The Middle of the Story

Explain how to solve each equation. Be as detailed as possible.

Solutions

1.1 $x = 7$

1.2 $x = 15$

1.3 $x = -10$

Unit 7.6, Practice Day 1: Practice Problems

Problem 2

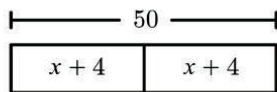
My best friend and I are the same age. In 4 years, our ages will add to 50 years! We plan to celebrate big time.

For this situation:

- 2.1 Create a visual representation.
- 2.2 Write an equation using the variable x .
- 2.3 Explain what x represents.

Solution

- 2.1 *Representations vary.*



- 2.2 $2(x + 4) = 50$ or $2x + 8 = 50$
- 2.3 x represents how old my best friend and I are now.

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Reflect

1. What advice would you give to yourself or others when solving equations?

2. Name one strategy you've found useful so far, and explain why it was useful to you. Also, if you learned it from another student, give that student credit.

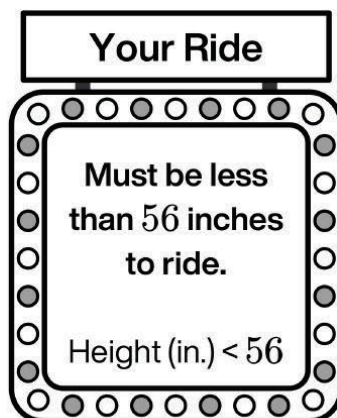


This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 13: Notes

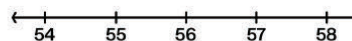
Name _____

My Notes

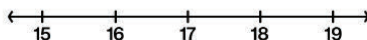


1.1 Darryl is 56 inches tall. Can he go on the carousel?

1.2 Make a graph on the number line to represent the possible heights for this ride.

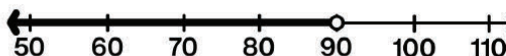


2.1 Make a graph on the number line to represent the solutions to $x \geq 17$.



2.2 How can you tell whether 17 is included in the inequality?

3. Write an inequality that represents this graph:



Summary

I understand and can use the symbols \leq and \geq .

I can graph inequalities on a number line.

Unit 7.6, Lesson 13: Practice Problems

Name _____

Warm-Up

Select **all** of the inequalities that are true if $x = 4$.

$x < 2$

$x < 10$

$x < 4$

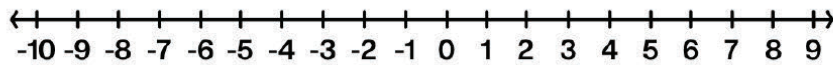
$x \geq 4$

$x \geq 8$

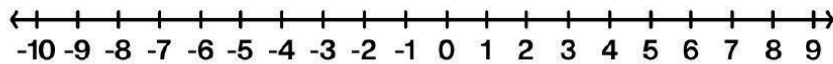
Practice

Draw the solution set of each inequality.

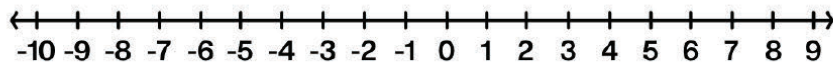
1.1 $x \leq 5$



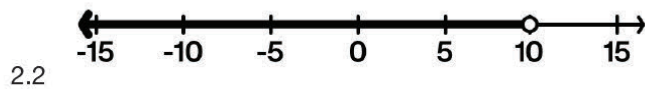
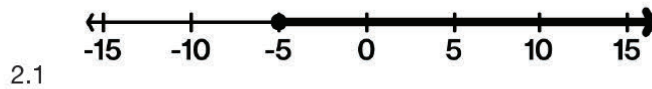
1.2 $x < \frac{5}{2}$



1.3 $x \geq -6.5$



Write the inequality represented by the graph of the solution set.





Unit 7.6, Lesson 13: Practice Problems

Here are two stories and two equations.

<p>A. This year's freshman class is 10% smaller than last year's class. But during the first week of classes, 20 more students join. There are now 830 students in the freshman class.</p>	$0.9x + 20 = 830$
<p>B. A store reduces the price of a computer by \$20. Then, during a 10% off sale, a customer pays \$830.</p>	$0.9(x - 20) = 830$

- 3.1 Decide which equation represents each story. 3.2 Explain why one equation has parentheses and the other doesn't.
- Story A: _____
- Story B: _____
- 3.3 Solve each equation. 3.4 What does each solution tell you about its story?

Explore

For each value of x , decide whether it makes each inequality true or false.

	$x = -100$	$x = 0$	$x = 25$	$x = 100$
$x < 25$				
$100 \leq 4x$				
$-3x \geq -75$				
$10 > 35 - x$				

Reflect

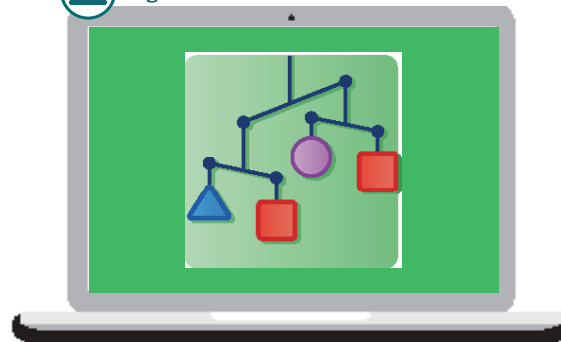
- Circle the question that you are least confident about on this practice worksheet.
- Use the space below to ask one question you have or to share something you are proud of.

Unbalanced Hangers

Let's solve inequalities using hanger diagrams.



Digital Lesson

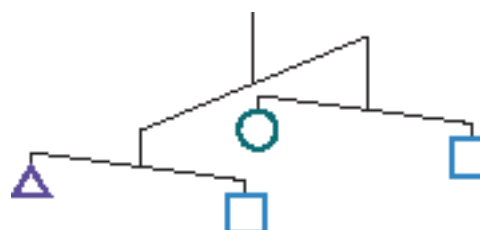


Warm-up

- 1 Order the shapes in the hanger from lightest to heaviest.

Lightest

Heaviest



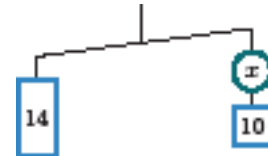
Explain how you decided which shape was the lightest.

Activity

1

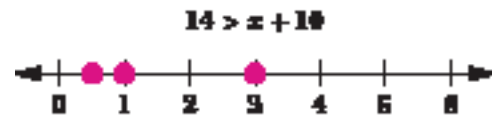
Unbalanced Hangers

- 2 Here is a hanger that is not balanced. What is one possible value for the weight of x ?



- 3 Plot your response from the previous problem on the number line.

Determine at least two more possible weights and plot those on the number line.



- 4 Describe *all* of the possible weights for x that keep the right side lighter.

Name: _____ Date: _____ Period: _____

Unbalanced Hangers (continued)

The solutions to an inequality include all of the possible values that make an inequality true.

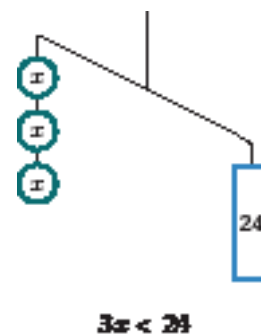
5 This hanger represents the inequality $3x < 24$.

What are the solutions to this inequality?

A. $x < 8$



B. $x > 8$



6 Here are three statements. $3x < 24$ $3x = 24$ $3x \leq 24$

Discuss How are they alike? How are they different?

Solve the equation $3x = 24$. Graph the solution.

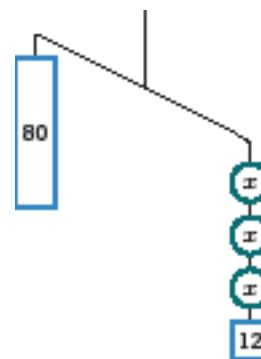


Use your solutions to $3x < 24$ and $3x = 24$ to determine and graph the solution to $3x \leq 24$.



7 This hanger represents the inequality $80 < 4x + 12$. Here are three possible solutions to this inequality and their graphs.

Possible solution	Correct or incorrect
$17 > x$	<p>A number line from 13 to 21 with arrows at both ends. A solid dot is at 17, and the line is shaded to the left. A purple 'X' is above 15, and a green checkmark is above 17.</p>
$17 = x$	<p>A number line from 13 to 21 with arrows at both ends. A solid dot is at 17. A purple 'X' is above 17.</p>
$17 < x$	<p>A number line from 13 to 21 with arrows at both ends. An open circle is at 17, and the line is shaded to the right. Green checkmarks are above 17 and 18.</p>



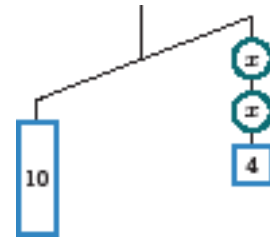
Discuss What do the checks and Xs on the graphs mean?

Activity
2

Solving Inequalities

- 8** What are the solutions to the inequality $10 \geq 2x + 4$?

Use the hanger diagram if it helps with your thinking.

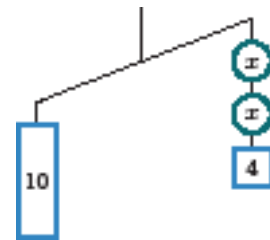


- 9** Jasmine and Terrance solve the inequality $10 \geq 2x + 4$ from the previous problem.

Jasmine says the solutions are $x \leq 3$.

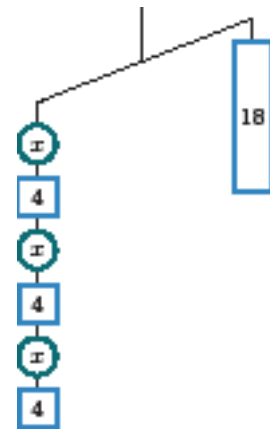
Terrance says the solutions are $3 \geq x$.

Who is correct? Explain your thinking.



- 10** What are the solutions to the inequality $3(x + 4) \geq 18$?

Use the hanger diagram if it helps with your thinking.



Name: Date: Period:

Repeated Challenges

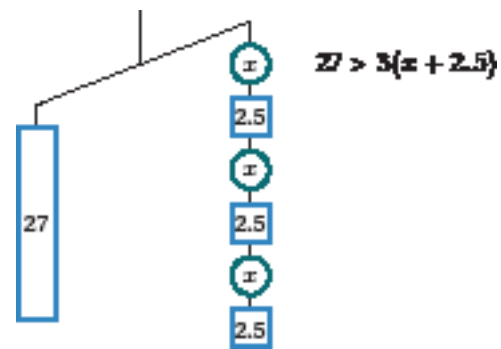
- 11** With your partner, decide who will solve the inequalities in Column A and who will solve the ones in Column B. The solutions to the inequalities in each row are the same. After each inequality, compare your solutions and resolve any differences.

Column A	Column B
$4x + 2 \leq 10$	$6x + 4 \leq 16$
$12 > 3(x + 1)$	$5(x + 2) < 25$
$2x + 1.5 \geq 8.3$	$24.9 \leq 6x + 4.5$
$2x + \frac{3}{2} > \frac{17}{2}$	$4x + \frac{2}{3} > \frac{44}{3}$

12 Synthesis

Describe a process you can use to determine the solutions to an inequality.

Use the diagram if it helps show your thinking.



You can solve an inequality in similar ways that you solve an equation to determine the values of x that make the inequality true. These values are known as the *solutions to an inequality*. You can test values by substituting them into the inequality.

For example, consider the inequality $4x + 2 < 22$.

- To determine the value of x that balances the hanger, solve the equation $4x + 2 = 22$.
- When $x = 5$, the hanger is balanced. All values less than 5 will make the inequality true because $4x + 2$ needs to be less than 22.

The solution shown on the graph means that all values of x less than 5 will make the inequality true.



To check the solution, substitute any value less than 5 into the original inequality.

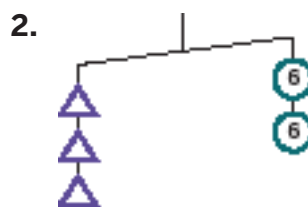
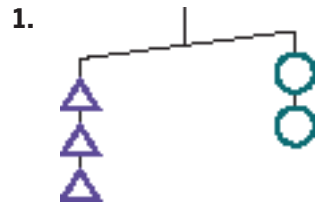
$$4(4) + 2 < 22$$

$$16 + 2 < 22$$

$$18 < 22 \checkmark$$

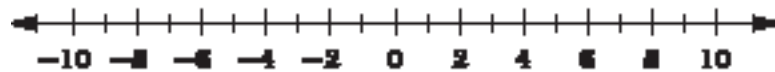
Practice

For Problems 1 and 2, use this information. Here is an unbalanced hanger. Write an inequality to represent the relationship between the weights. Use t to represent the weight of the triangle in grams. Use c to represent the weight of the circle in grams.

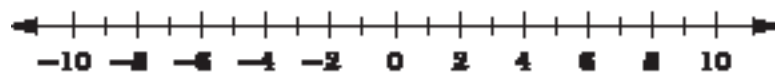


For Problems 3–5, solve each inequality. Use the number line graph to show the solutions for each inequality.

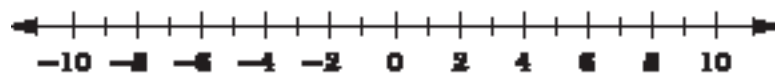
3. $5x \leq 20$



4. $11 > 2x + 1$

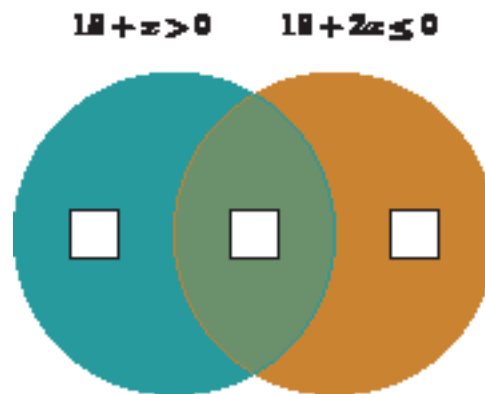


5. $2(x + 3) > 18$



6. List three values for x that would make $5x \leq 20$ true.

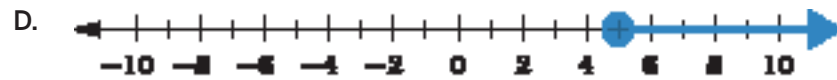
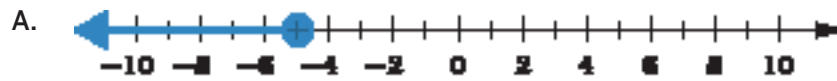
7. Write a value in each region that makes the inequality or inequalities true.



Practice

Name: _____ Date: _____ Period: _____

8. Which number line represents the solutions to the inequality $3x - 8 \leq 7$?



Spiral Review

9. Select *all* of the values that are solutions to $x \leq -4$.

- A. 4 C. -3.99 E. 0
B. -4 D. -4.01

10. Complete the long division to finish writing $\frac{5}{8}$ as a decimal.

$$\begin{array}{r} 0.6 \\ 8 \overline{) 5.00} \\ \underline{-48} \end{array}$$

Reflection

- Put a star next to your favorite question.
- Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 15: Budgeting

Name(s) _____

Activity 1: Maia's Magazines

Maia has a job where she earns \$19 per week, plus \$3 for every magazine subscription that she sells. She wants to use the money she earns to buy soccer equipment.

This week, Maia wants to buy a new ball. The cheapest ball she wants costs \$43.

1. Write and solve an equation to determine how many magazine subscriptions Maia needs to sell to make \$43.
2. List other numbers of magazine subscriptions Maia could sell and still buy the ball.
3. Write an inequality to represent **all** the number of subscriptions Maia could sell and still buy the ball.

The following week, Maia earns \$37. She wants to use it to buy soccer shorts and 5 pairs of socks. The shorts she wants cost \$22.05. Each pair of socks cost the same amount.

4. What is the price of each pair of socks if Maia spends **exactly** \$37 on the socks and shorts? (In Maia's city, there is no sales tax.) Write and solve an equation if it is helpful.
5. Write an inequality to represent **all** the sock prices that Maia could afford.



Unit 7.6, Lesson 15: Budgeting

Name(s) _____

Activity 2: Bao's Budgeting

Bao has \$175 saved in a bank account. He wants to know how much money he can take out each month if he wants to have at least \$25 in the account a year from now.

- Circle the inequality that represents Bao's situation.
A. $175 - 12x \leq 25$ B. $175 + 12x \leq 25$ C. $175 - 12x \geq 25$ D. $175 + 12x \geq 25$
- What does 12 represent?
- What does x represent?
- Bao and his friend try to solve the inequality. Bao's answer starts with $x \leq$. His friend's answer starts with $x \geq$. Which symbol makes sense for this situation?
Explain your thinking.
- Solve the inequality you chose and explain what it means.

Bao is considering getting a part-time job. Instead of taking money **out** of his account each month, he would put money **in**. His account still has \$175, and his goal is to have \$1000 in the account a year from now.

- Write an inequality where x represents how much Bao should put in each month to reach his goal.
- Solve the inequality you wrote and explain what the solutions mean.

Unit 7.6, Lesson 15: Notes

Name _____

My Notes

Koharu is making candies for a party. She plans to give 10 candies to her sister and then include 5 candies in each gift bag. She has enough ingredients to make 100 candies.

1.1 Solve the inequality $10 + 5x \leq 100$.

1.2 Explain what the solutions to the inequality mean.

Koharu gets \$75 for her birthday. She plans to save it and add more money each month until her next birthday. Her goal is to have more than \$300 saved a year from now.

2.1 Write an inequality where x represents how much Koharu should save each month to reach this goal.

2.2 Solve the inequality you wrote and explain what the solutions mean.

Summary

I can figure out the solutions to an inequality.

I can explain the difference between the solution to an equation and the solutions to an inequality.



Unit 7.6, Lesson 15: Practice Problems

Name _____

Warm-Up

Determine the products.

$\frac{2}{5} \cdot -10$

$-8 \cdot \left(\frac{-3}{2}\right)$

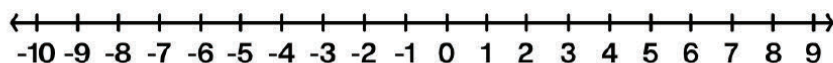
$\left(\frac{10}{6}\right) \cdot 0.6$

$\left(\frac{-100}{37}\right) \cdot (-0.37)$

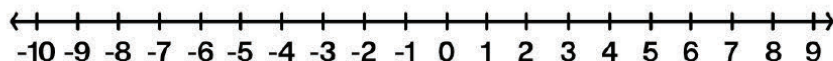
Practice

Draw the solution set of each inequality.

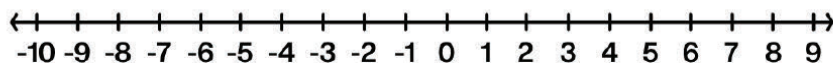
1.1 $x > 7$



1.2 $2x \geq -7$



1.3 $3x + 1 < 4$



Solve the inequality that represents each story. Then interpret what the solution means in the story.

- 2.1 Alina donates x dollars out of every \$9 that she earns. This happens 7 times this month. Alina wants to be sure she keeps at least \$42 from this month's earnings.

$7(9 - x) \geq 42$

- 2.2 Jamir buys a candle that is 9 inches tall and burns down 0.5 inches per minute. He wants to let the candle burn for x minutes until it is less than 6 inches tall.

$9 - 0.5x < 6$

Unit 7.6, Lesson 15: Practice Problems

Here are some prices customers paid for different items at a farmer's market.
Find the cost for 1 pound of each item.

3.1 \$5 for 4 pounds of apples

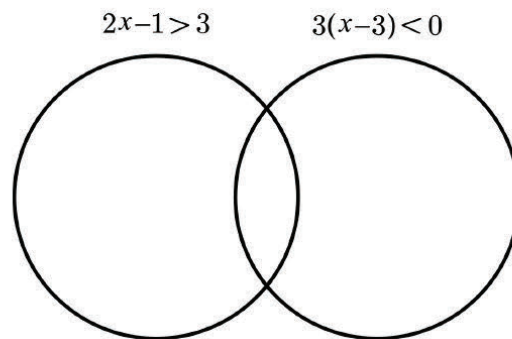
3.2 \$3.50 for $\frac{1}{2}$ a pound of cheese

3.3 \$8.25 for $1\frac{1}{2}$ pounds of coffee beans

3.4 \$6.75 for $\frac{3}{4}$ of a pound of fudge

Explore

Write a value in each region that makes the inequality or inequalities true.



Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6, Lesson 16: Notes

Name _____

My Notes

Here's an inequality: $3(10 - 2x) < 18$.

Ava solved the equation $3(10 - 2x) = 18$ and calculated $x = 2$.

1.1 Choose a value for x that is greater than 2 and substitute it into $3(10 - 2x) < 18$.

1.2 Choose a value for x that is less than 2 and substitute it into $3(10 - 2x) < 18$.

1.3 What are the solutions to the inequality?

1.4 Graph the solutions on this number line.



2. Tyrone is solving the inequality $5 - 0.5x \geq 3$. He says that the solutions to the inequality are $x \leq 4$.

Is this correct? Explain how you know.

Summary

- I can solve an inequality with positive and negative numbers and graph the solutions.
- I can test values to decide which inequality symbol makes sense.

Warm-Up

Select **all** of the values of x that make the inequality $-x + 6 \geq 10$ true.


- 3.9 4 -4.01 -4 4.01 3.9 0 -7

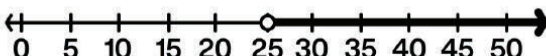
Practice

The library is having a party for any student who read at least 25 books over the summer. Determine which inequality describes each situation.

1.1 Ricardo read x books and was invited to the party. $x < 25$

1.2 Prisha read x books over the summer but was not invited to the party. $x > 25$

1.3  $x \leq 25$

1.4  $x \geq 25$

2.1 Select **all** of the values of x that make the inequality $100 - 3x \geq -50$ true.

- 0 50 -50 49.9 50.1

2.2 In order to solve the inequality $100 - 3x \geq -50$, Makayla solves the equation $100 - 3x = -50$ and gets $x = 50$. What is the solution to the inequality?

2.3 Explain what the solution to the inequality means.



Unit 7.6, Lesson 16: Practice Problems

Alma makes 5 cups of her favorite shade of purple paint by mixing 3 cups of blue paint, $1\frac{1}{2}$ cups of red paint, and $\frac{1}{2}$ a cup of white paint.

Alma has 2 cups of white paint.

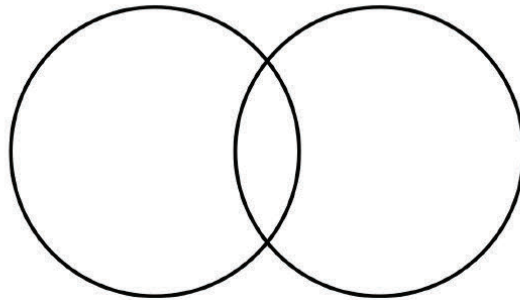
3.1 Assuming she has enough red paint and blue paint, how much purple paint can Alma make?

3.2 How much blue paint and red paint will Alma need to use with the 2 cups of white paint?

Explore

Write a value in each region that makes the inequality or inequalities true.

$$5 - 2x \leq -3 \quad -3(-5 + x) \geq 3$$



Reflect

1. Circle the question you enjoyed doing the most.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

Unit 7.6 Lesson 17: Write Them and Solve Them Name _____

Activity 1: Orange Juice and Donuts

Kiandra wants to surprise some friends before school with orange juice and donuts. At the store, an orange juice costs \$2.15 and a donut costs \$0.75. There is no sales tax. The store has a \$10 purchase minimum for credit cards. Kiandra used her credit card to pay. How many friends might she have bought treats for?

1. Write an inequality that describes Kiandra's situation.

2. Solve the inequality you wrote.

3. What does the solution to your inequality mean in this situation?



Unit 7.6 Lesson 17: Write Them and Solve Them Name _____

Activity 2: Solve It!

For this activity, you need either a problem card or a support card.

If you have a **problem card**:

1. Read the problem aloud.
2. Write an inequality that describes the problem.
3. Solve your inequality.
4. Answer the question on your card using the solution to the inequality you wrote.

If you have a **support card**:

- Your goal is to help your partner by asking the questions on the card.
- You may also add questions of your own.

Workspace:

Unit 7.6, Lesson 17: Notes

Name _____

My Notes

A restaurant has a water dispenser with 500 ounces of water. Each cup of water they serve is 12 ounces. The restaurant likes the water dispenser to have at least 100 ounces of water in it at all times.

1.1 Write an inequality that describes the problem.

1.2 Solve your inequality.

1.3 Explain what the solutions to the inequality mean in this situation.

Cho and their three siblings plan to order lunch from a restaurant. They each order juice for \$2.50 per person. If Cho has \$52 to pay for lunch, how much can each person spend on their meal?

2.1 Write an inequality that describes the problem.

2.2 Solve your inequality.

2.3 Explain what the solutions to the inequality mean in this situation.

Summary

- | |
|--|
| <p><input type="checkbox"/> I can explain whether or not fractions or negative numbers make sense as solutions to an inequality.</p> <p><input type="checkbox"/> I can write and solve an inequality to answer a question about a situation.</p> |
|--|



Unit 7.6, Lesson 17: Practice Problems

Name _____

Warm-UpSelect **all** of the inequalities that have the same solutions as $-4x < 20$.

- $-x < 5$ $4x > -20$ $4x < -20$ $x < -5$ $x > -5$ $x > 5$

Practice

When a store sold $\frac{2}{5}$ of the shirts that were on display, they brought out another 30 from the stockroom. The store likes to keep at least 150 shirts on display.

The manager wrote the inequality $\frac{3}{5}x + 30 \geq 150$ to describe the situation.

- 1.1 Explain what $\frac{3}{5}$ means in the inequality.
- 1.2 Solve the inequality.
- 1.3 Explain what the solution to the inequality means in this situation.

Camila has up to \$100 to spend on her birthday party at a city swimming pool. There will be 15 friends total. She also plans to spend \$38.50 on pizza. How much can she spend per person to go to the pool?

- 2.1 Write an inequality to represent this situation.
- 2.2 Solve the inequality you wrote.
- 2.3 Explain what the solution to the inequality means in this situation.

Unit 7.6, Lesson 17: Practice Problems

Solve each equation.

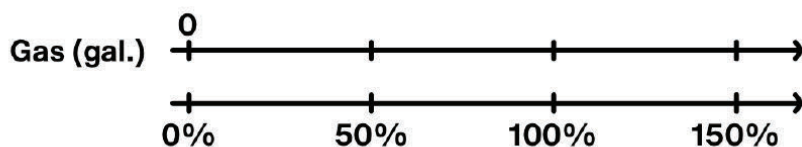
3.1 $-1d - 4 = -3$

3.2 $-\frac{1}{4}m + 5 = 16$

3.3 $10b + (-45) = -43$

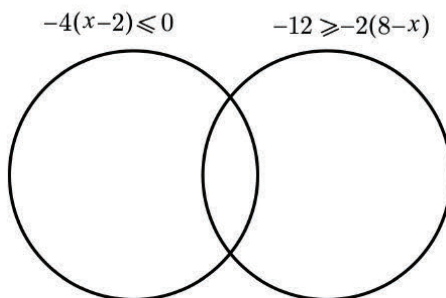
3.4 $-8(y - 1.25) = 4$

4. The gas tank of a truck holds 30 gallons. The gas tank of a passenger car holds 50% less. How many gallons does it hold?



Explore

Write a value in each region that makes the inequality or inequalities true.



Reflect

1. Circle the question you feel most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

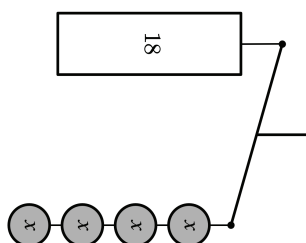
Unit 7.6, Practice Day 2: Cards

Here is an inequality: $2x + 6 > -12$

1.1 Solve the inequality.

1.2 Graph all of the solutions to the inequality.

This hanger represents the inequality $18 < 4x$.



2.1 What are the solutions to this inequality?

2.2 Graph all of the solutions to the inequality.

Solve each equation.

3.1 $-2x + 11 = -4$

3.2 $56 = 7(7 - x)$

4.1 Write an equivalent expression in expanded form.

$-\frac{1}{2}(14x - 22)$

4.2 Write an equivalent expression in factored form.

$-15x + 25$

Unit 7.6, Practice Day 2: Cards

5.1 Write an expression equivalent to $-3x + 5 - 2(3x - 1)$ with only two terms.

5.2 Solve the equation $-3x + 5 - 2(3x - 1) = 7$.

6.1 Determine **three** values of x that make $4 - x \geq 10$ true.

6.2 Make a graph to represent all of the solutions to $4 - x \geq 10$.

There is a tradition in Japanese culture where a community folds 1 000 origami paper cranes for special occasions and for healing. Mikko and his family are folding paper cranes for his cousin's wedding. 230 have already been folded. There are 6 people folding cranes.

7.1 Write and solve an equation that represents the situation.

7.2 How many cranes does each member of Mikko's family need to make to meet their goal?

Aaliyah has \$50 on her bus card. Each ride costs \$1.50. The bus card requires a balance of \$3.00 or more at all times.

8.1 Write an inequality that represents the number of bus rides Aaliyah can take before she needs to add money to her card.

8.2 Solve the inequality you wrote.

**Unit 7.6, Practice Day 2: Cards**

Solve each equation.

9.1 $4x + 16 = 3$

9.2 $-5(x - 1) = -35$

There are 6 members in Marcela's family. They have a \$75 gift card to a restaurant. They plan to order a pie for dessert that costs \$11.99.

11.1 Which inequality describes how much each person can spend on their meal if they pay with the gift card?

- A. $11.99 - 6n \geq 75$ B. $11.99 - 6n \leq 75$
C. $11.99 + 6n \geq 75$ D. $11.99 + 6n \leq 75$

11.2 Solve the inequality you selected.

Katie wants to include stickers in the gift bags for a party. Stickers come in packs of 25. She wants to give each of the 17 guests at least 10 stickers.

How many packs of stickers will she need?

10.1 Write and solve an inequality that describes this situation.

10.2 Explain what the solutions to your inequality mean in this situation.

12.1 Write an equivalent expression in expanded form.

$$\frac{1}{3} (24 - 6x)$$




12.2 Write an equivalent expression in factored form.

$$6x - 15$$

Unit 7.6, Practice Day 2: Worksheet

Name _____

Use this worksheet to solve each problem.

1.1	2.1
1.2	2.2
	
3.1	4.1
3.2	4.2
5.1	6.1
5.2	6.2
	



Unit 7.6, Practice Day 2: Worksheet

Name _____

7.1	8.1
7.2	8.2
9.1	10.1
9.2	10.2
11.1	12.1
11.2	12.2

Unit 7.6, Practice Day 2: Practice Problems

Name _____

Warm-Up

1. Draw a graph that shows all the values that make the inequality $3x < -6$ true.
2. Draw a graph that shows all the values that make the inequality $3x \leq -6$ true.



3. Explain how your graphs are similar and different.

Practice: The Middle of the Story

In this practice set, you will see problems (beginnings) **and** their solutions (ends). Your task is to explain all of the parts in the middle.

Problem 1

Write an equivalent expression by adding, factoring, or expanding.

1.1 $-5(3 - 2a)$

1.2 $-6b - 15$

1.3 $14 - 28c + 7c$

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Solution

1.1 $-15 + 10a$ (or equivalent)

1.2 $-3(2b + 5)$ (or equivalent)

1.3 $14 - 21c$ (or equivalent)



Unit 7.6, Practice Day 2: Practice Problems

Problem 2

The painting class Oscar teachers can have no more than 30 students in it. If 13 students have already signed up and 5 new students sign up each day, how many more days can he keep the sign-ups open for?

- 2.1 Write an inequality that describes this situation.
- 2.2 Solve the inequality you wrote.
- 2.3 Explain what the solutions to the inequality mean in this situation.

Solution

- 2.1 $5x + 13 \leq 30$
- 2.2 $x \leq 3.4$
- 2.3 This means that Oscar can keep sign-ups open for 3 more full days.

The Middle of the Story

Explain how to go from the problem to the solution. Be as detailed as possible.

Reflect

1. Write 1–2 big ideas from this unit that you think are important to understand.

2. What is one math concept from this unit that you have improved on since the unit started? Explain what you did to help yourself improve.

GRADE 7

Unit 7

Student Lessons

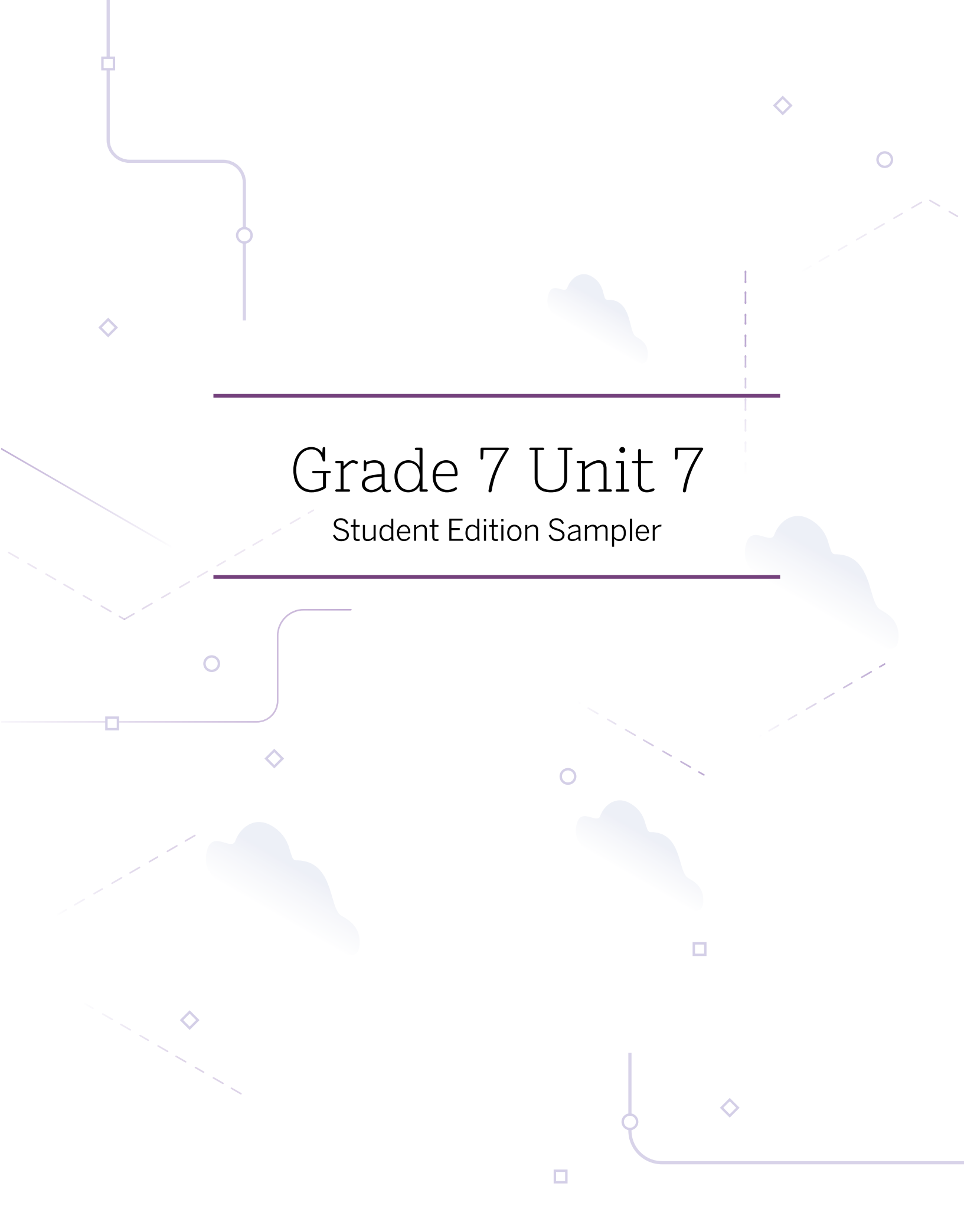
Student lessons from Unit 7 are included here to provide NYC reviewers with access to the specific lessons in Amplify Desmos Math New York that demonstrate coverage of the **Expressions, Equations, and Inequalities** domain.

These lessons are partially designed and will be updated to match the exemplar Student Edition lessons included earlier in this sampler.

NOTE: *We have included only those lessons from Unit 7 that cover the standards in the Expressions, Equations, and Inequalities domain.*

Grade 7 Unit 7

Student Edition Sampler



This lesson is still being upgraded to the Amplify Desmos Math design style for the 2024–25 school year.

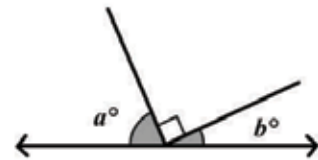
Unit 7.7, Lesson 3: Notes

Name _____

My Notes

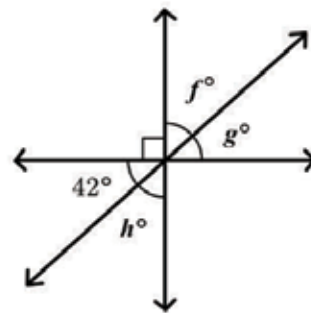
1.1 Draw an example of vertical angles.

1.3 Explain why the shaded angles are not vertical.



1.2 Label each angle with an estimate of its measure.

2.1 Determine the values of f , g , and h .



2.2 Explain how you figured out the value of angle f .

Summary

- I can describe what vertical angles are.
- I can write and use equations to determine unknown angles.

Unit 7.7, Lesson 3: Practice Problems

Name _____

Warm-Up

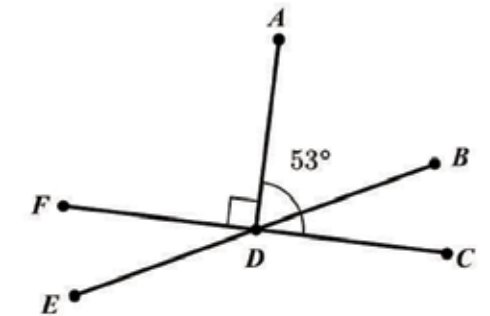
Select all of the equations that are equivalent to $3x + 45 = 180$.

- $3(x + 45) = 180$
- $3(x + 15) = 180$
- $3(x + 15) = 60$
- $x + 15 = 60$
- $3x = 135$

Practice

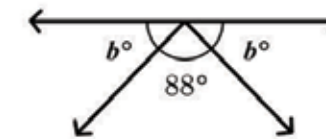
1.1 Determine the measure of each angle.

Angle	Measure (degrees)
ADB	53
BDC	
CDE	
FDE	
FDA	



1.2 Identify one pair of vertical angles in the diagram. Explain how you know they are vertical angles.

2.1 Which equation represents the relationship between the angles in the figure?



- A. $88 + b = 90$
- B. $88 + b = 180$
- C. $2b + 88 = 90$
- D. $2b + 88 = 180$

2.2 Dakota says that the angles marked b are vertical angles. Eva disagrees.

Who do you agree with?
Explain your reasoning.

**Unit 7.7, Lesson 3: Practice Problems**

Eva is solving the equation $4(x + \frac{3}{2}) = 8$. She says, "I can subtract $\frac{3}{2}$ from each side to get

$4x = \frac{13}{2}$ and then divide by 4 to get $x = \frac{13}{8}$." Dakota says, "I think you made a mistake."

3.1 How can Dakota know for sure that Eva's solution is incorrect?

3.2 Describe the error that Eva might have made.

3.3 Determine the correct value for x .

Explore

Draw a diagram that includes supplementary, complementary, and vertical angles.

Measure as many angles as you can, but only label some of them.

Then, trade with a classmate and solve for the missing angles in their puzzle.

Reflect

1. Star the question you are most confident about.
2. Use the space below to ask one question you have or to share something you are proud of.

Unit 7.7, Lesson 4: Missing Measures

Name _____

Activity 1: Solving Challenges

For this activity, you need challenge cards and a partner.

Circle one: I am partner A / B.

Challenge 1

Based on the diagram:

1. Estimate each measure.
2. Write at least one true equation.

3. Ask your partner for the missing measure.
Then determine every other measure.

Challenge 2

Based on the diagram:

1. Estimate each measure.
2. Write at least one true equation.

3. Ask your partner for the missing measure.
Then determine every other measure.

Challenge 3

Based on the diagram:

1. Estimate each measure.
2. Write at least one true equation.

3. Ask your partner for the missing measure.
Then determine every other measure.

Unit 7.7, Lesson 4: Missing Measures

Name _____

Activity 2: Trading Challenges

- Create and label your own challenge.** On a separate sheet of paper, use a ruler or straightedge to draw a diagram with complementary, supplementary, and/or vertical angles. Then use a protractor to measure and label **one** angle. Label the rest of the angles with variables.
- Solve your challenge.** Without using a protractor, determine as many missing angle measures as you can for your diagram. Show all of your work in the space below. (Do not write directly on your diagram!)
- Trade and solve.** Trade your challenge with a partner. Without using a protractor, determine as many missing angle measures in their diagram as you can. Repeat up to four times.

Partner 1's name: _____ Partner 2's name: _____

Given angle measure: _____ Given angle measure: _____

Missing angle measures: _____ Missing angle measures: _____

Partner 3's name: _____ Partner 4's name: _____

Given angle measure: _____ Given angle measure: _____

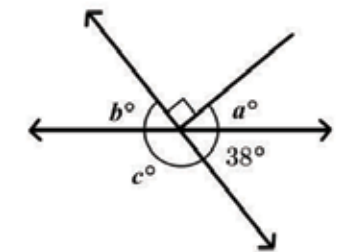
Missing angle measures: _____ Missing angle measures: _____

Unit 7.7, Lesson 4: Notes

Name _____

My Notes

1.1 Determine the values of a , b , and c .



1.2 Which missing value did you figure out first?

What angle relationship did you use?

1.3 Write at least two true equations based on this diagram.

1.4 Write one equation that is **not** true based on this diagram. Explain how you know the equation is not true.

Summary

I can solve multistep problems using what I know about complementary, supplementary, and vertical angles.

Unit 7.7, Lesson 4: Practice Problems

Name _____

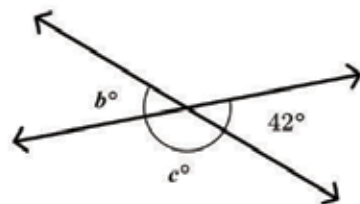
Warm-Up

Select **all** of the equations that are equivalent to $4x + 20 = 90$.

- $4(x + 5) = 90$
 $x + 5 = 22.5$
 $4(x + 20) = 90$
 $x + 20 = 22.5$
 $4x = 70$

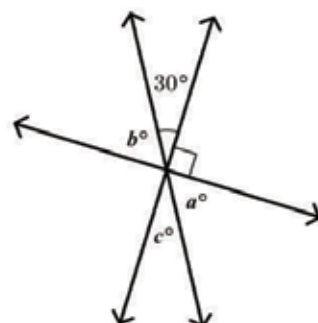
Practice

1. Determine the values of b and c .



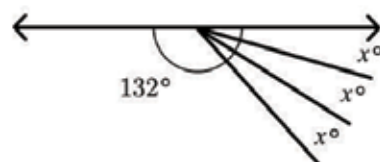
2.1 Select **all** of the true statements.

- $a + c = 90$
 $b = c$
 $30 + b = 180$
 $a + b + c + 30 = 180$
 The angles marked a° and b° are vertical.
 The angles marked a° and c° are complementary.



2.2 Determine the values of a , b , and c .

3.1 Write an equation that represents the angle relationships in this diagram. Explain what each part of your equation means in the diagram.



3.2 Solve your equation.

Unit 7.7, Lesson 4: Practice Problems

Solve each inequality.

4.1 $-24 > -6(x - 0.5)$

4.2 $8x + 6 > -30$

A runner ran $\frac{2}{3}$ of a race in 21 minutes. They ran the entire race at a constant speed.

5.1 Is the relationship between time and distance proportional? Explain how you know.

5.2 How long did it take to run the entire race?

Explore

Draw a diagram that includes two angles that are both vertical and complementary.

Draw a diagram that includes two angles that are both vertical and supplementary.

Reflect

- Star the question you are most proud of.
- Use the space below to ask one question you have or to share something you are proud of.

