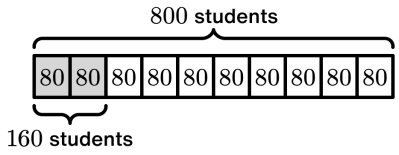
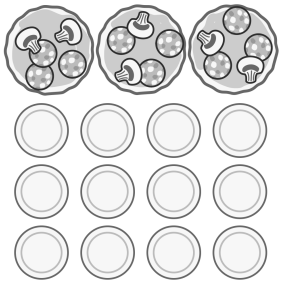
Fractions and Decimals
Student Guide

Math 6 Unit 3 Accelerated
Part 1

Glossary

Term	Definition
percent	Percent means *for every* 100. It is represented by the percent symbol: $\%$. We use percents to represent ratios and fractions. For example, 25% means $25:100$. 25% of something means $\frac{25}{100}$ or $\frac{1}{4}$ of it. If there are 800 students in a school, and 20% of them are on a field trip, then that means 160 students are on the trip, or 20 out of every 100 students. 
percentage	Percentage is a part of 100. It is similar to percent. For example: • Only a small percentage of students went on the trip. • If a goalie saves 96 out of 100 shots, his percentage of saves is 96%.
rate	A rate is a ratio that describes how two quantities change together.
unit price	The cost for one item or the cost per item. For example, if 4 avocados cost $\$12$, then the unit price is $\frac{\$12}{4} = \$3$ per avocado.
unit rate	A rate where one of the numbers is 1. For example, if 12 people share 3 pizzas equally, then one unit rate is 4 people per pizza. Another unit rate is $\frac{1}{4}$ pizza per person. 

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Unit 6.3, Family Resource

Unit 3 Summary

Prior Learning	Math 6, Unit 3	Future Learning
Grades 2–5 • Measuring length, volume, mass, or weight • Multiplication as scaling • Multiplication of fractions and decimals Math 6, Unit 2 • Introduction to ratios	• Units and measurement • Unit rates • Percentages	Math 6, Unit 5 • Operations with decimals Math 7, Unit 4 • Proportional relationships • Percent increase and decrease

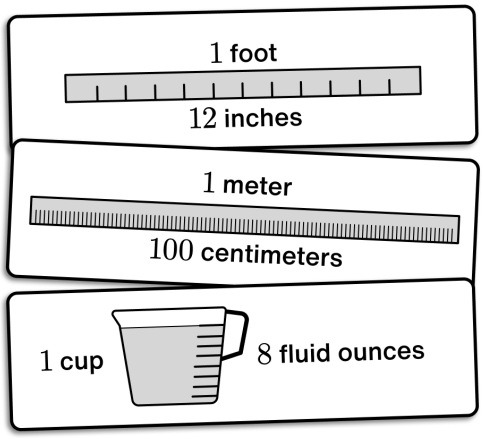
Units and Measurement

Sometimes, measurements are given in one unit and they would be more helpful in a different unit.

When converting, it can be helpful to think about which unit is larger. For example, one foot is larger than one inch, so you would need more inches to measure the same length.

Since there are 12 inches in a foot, you can convert from feet to inches by multiplying by 12.

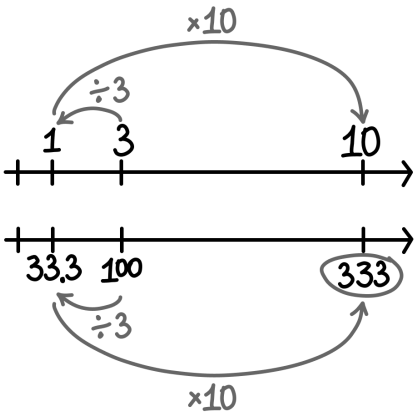
You can convert from inches to feet by multiplying by $\frac{1}{12}$.



Sometimes the conversions aren't as neat.

If you want to know how many feet a 100-meter race is, you can use the relationship 3 meters $\approx$ 10 feet.

You can use the ratio strategies from the previous unit, like making a double number line diagram or a table, to convert 100 meters to feet.



100 meters $\approx$ 333 feet

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Unit 6.3, Family Resource

Unit Rates

A *unit rate* is a ratio expressed as something "per 1." Every ratio has two unit rates.

For example, a parking meter says the price is $\$3$ for 60 minutes.

You can use a double number line or table to determine two unit rates for this situation:

20 minutes per dollar and $\$0.05$ per minute

Dollars	Time (min.)
3	60
1	20

(÷3 between Dollars; ÷3 between Time)

Dollars	Time (min.)
3	60
0.05	1

(÷60 between Dollars; ÷60 between Time)

Different unit rates are useful depending on the problem you're solving.

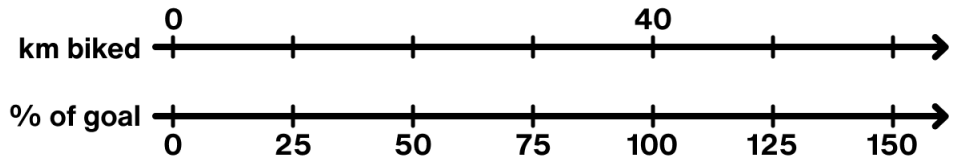
- If you have $\$1.35$ in your pocket, you can get $1.35 \cdot 20 = 27$ minutes of parking.
- If you need 45 minutes of parking, you should pay the meter $45 \cdot 0.05 = \$2.25$.

Percentages

Unit rates are "rates per 1." *Percentages* are "rates per 100." For example, 5% means 5 per 100.

You can use ratio strategies like tape diagrams, double number lines, and tables to reason about percentages.

For example, if Binta's goal is to ride 40 kilometers, you can create a double number line where 40 kilometers lines up with 100%. Then, 50% of the ride is 20 kilometers, 75% is 30 kilometers, etc.

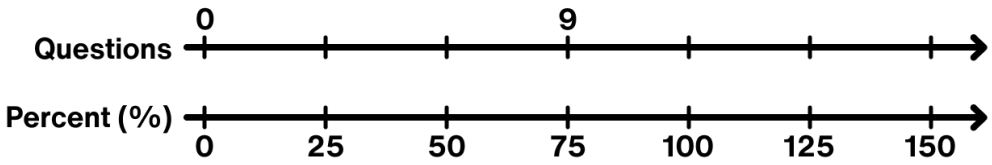


For more complicated percentages, expressions can help. To calculate 83% of 40 kilometers, you can first calculate 1% of 40 ($\frac{40}{100}$) and then multiply by 83. In all, $\frac{40}{100} \cdot 83 = 33.2$ kilometers.

Percentages

3. Arturo gets a burger and fries for $\$12$. He wants to give a 20% tip. How much is the tip?

4. Sadia got 75% of the questions right in a trivia game. If she got 9 questions right, how many questions are in the game? Use the double number line if it helps with your thinking.



5. Chloe set a goal to run 8 miles. She ended up running 12 miles. What percent of her goal did she run? Make a double number line if it helps with your thinking.

Try This at Home

Units and Measurement

10 kilograms weighs about the same as 22 pounds.

1.1 Which is heavier: 1 pound or 1 kilogram?

1.2 A canoe weighs 88 pounds. About how many kilograms does it weigh?

1.3 A watermelon weighs 13 kilograms. About how many pounds does it weigh?

Unit Rates

A store sells a 12-ounce bag of pistachios for $15.

2.1 What is the cost **per ounce**?

2.2 How many ounces of pistachios do you get **per dollar**?

2.3 Customers may choose to buy pistachios in other amounts at the same rate. How much would 17 ounces of pistachios cost?

2.4 How many ounces of pistachios can you buy for $7?

Unit 6.3, Family Resource

Solutions:

1.1 1 kilogram

1.2 About 40 kilograms

1.3 About 28.6 pounds

2.1 $1.25 per ounce

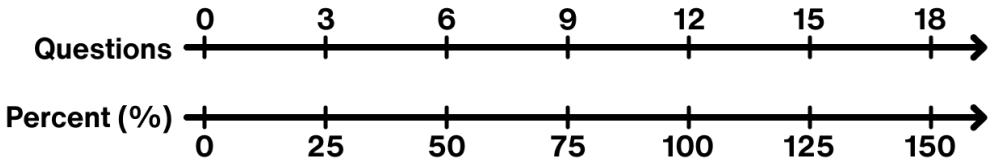
2.2 0.8 ounces per dollar

2.3 $21.25

2.4 5.6 ounces

3. $2.40

4. 12 questions



5. 150%

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Unit 6.4, Lesson 3: Notes Name _____

My Notes

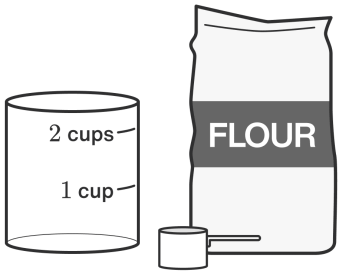
1. Ali needs 2 cups of flour.

   They have a $\frac{1}{4}$ -cup measuring scoop.

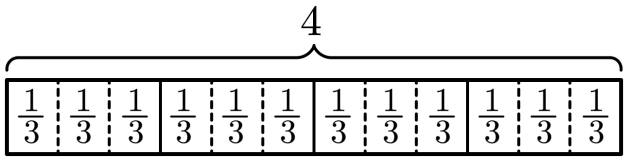
   How many scoops does Ali need?

   Make a drawing if it helps you with your thinking.

   8 **scoops**



Maneli drew a diagram to represent "how many $\frac{1}{3}$ s make 4."



2.1 Write at least one equation to represent Maneli's diagram.

Responses vary. $4 \div \frac{1}{3} = ?$

2.2 Answer Maneli's question.

12

Summary

- ☐ I can connect situations, diagrams, and expressions that represent "how many groups?"
- ☐ I can use diagrams to represent and solve division problems asking "how many groups?" and explain my strategy.

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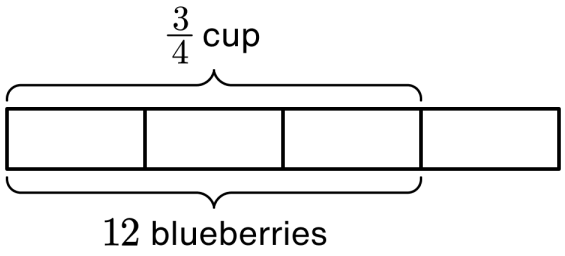
Unit 6.4, Lesson 4: Notes Name _____

My Notes

1. Caasi picked 12 blueberries, which filled $\frac{3}{4}$ of a cup.

   How many blueberries fill 1 cup?



16 **blueberries fill** 1 **cup.**

Imani is planting flowers to fill big and small planters.

2.1 6 flowers fill $\frac{2}{3}$ of a big planter. How many flowers fill 1 big planter?

9 **flowers**

Show or explain your thinking.

Explanations vary.

2.2 6 flowers fill $1\frac{1}{2}$ small planters. How many flowers fill 1 small planter?

4 **flowers**

Show or explain your thinking.

Explanations vary.

Summary

- ☐ I can connect situations, expressions, and tape diagrams that represent the same situation.
- ☐ I can use tape diagrams to represent and solve division problems when the answer is a fraction.

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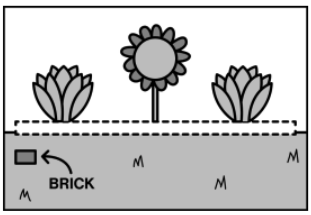
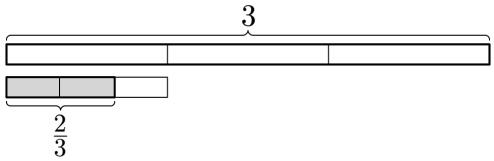
Unit 6.4, Lesson 5: Notes Name _____

My Notes

1.1 You are lining a 3-foot-long garden with $\frac{2}{3}$-foot-long bricks.

Draw a tape diagram to represent $3 \div \frac{2}{3}$.





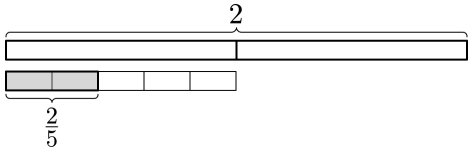
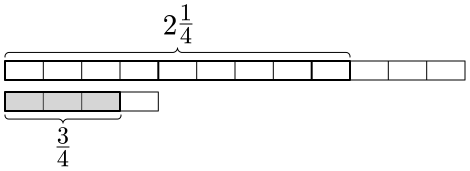
1.2 Yasmine says that you will need $4\frac{1}{3}$ bricks.

Explain why her answer is incorrect.

After using 4 bricks, there is a third of a foot remaining.

You will need $\frac{1}{2}$ of a brick for $\frac{1}{3}$ of a foot.

1.3 How many bricks will you need? $4\frac{1}{2}$ **bricks**

Division Sentence	Tape Diagram	Answer
2.1 $2 \div \frac{2}{5}$		5
2.2 $2\frac{1}{4} \div \frac{3}{4}$		3

Summary

- ☐ I can connect situations and expressions that represent "how many in 1 group?"
- ☐ I can use diagrams to represent and solve division problems asking "how many in 1 group?" and explain my strategy.

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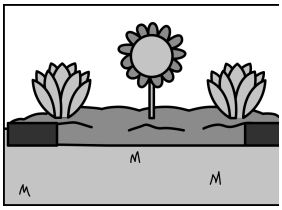
Unit 6.4, Lesson 6: Notes Name _____

My Notes

Isabella is filling gaps along the outside of a garden with $\frac{1}{2}$ -foot bricks.

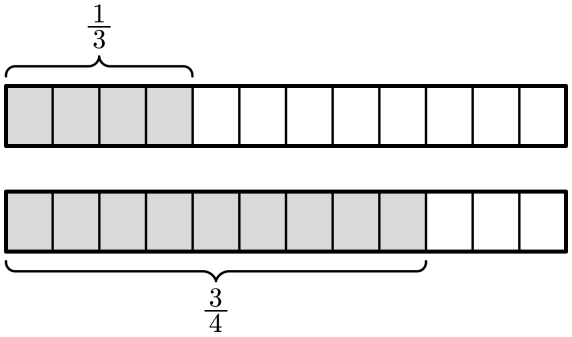


How many bricks does Isabella need to fill each gap?

1.1	1 -foot gap	2 **bricks**
1.2	$\frac{1}{4}$ -foot gap	$\frac{1}{2}$ **of a brick**
1.3	$\frac{3}{4}$ -foot gap	$1\ \frac{1}{2}$ **bricks**

2. Determine if the value of $\frac{1}{3} \div \frac{3}{4}$ is greater than or less than 1. Use the tape diagrams if they help you with your thinking.

Explanations vary.



Circle One	Less than 1	Greater than 1

Summary

- ☐ I can decide if the number of groups in a division problem is greater than or less than 1.
- ☐ I can use tape diagrams with common denominators to solve division problems.

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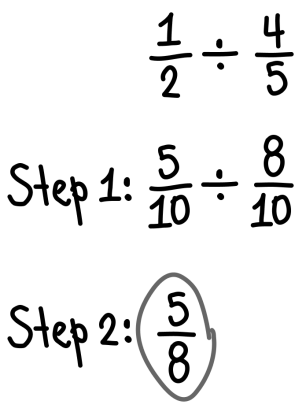
Unit 6.4, Lesson 7: Notes Name _____

My Notes

1. Here is Santino's work for calculating $\frac{1}{2} \div \frac{4}{5}$. Explain what you think Santino did at each step.



Responses vary.

Step 1:
Santino found a common denominator.

Step 2:
Since the two fractions in Step 1 have the same denominator, the parts of each fraction are the same size and the quotient can be represented as $\frac{5}{8}$.

Calculate the value of each expression.

2.1 $\frac{1}{4} \div \frac{7}{2}$ $\frac{1}{14}$ **(or equivalent)**	2.2 $5 \div \frac{2}{5}$ $\frac{25}{2}$ **(or equivalent)**
2.3 $\frac{8}{3} \div \frac{3}{4}$ $\frac{32}{9}$ **(or equivalent)**	2.4 $1\frac{1}{3} \div \frac{3}{5}$ $\frac{20}{9}$ **(or equivalent)**

Summary

- ☐ I can explain why $\frac{12}{5} \div \frac{3}{5}$ is equivalent to $12 \div 3$.
- ☐ I can use common denominators to divide fractions.

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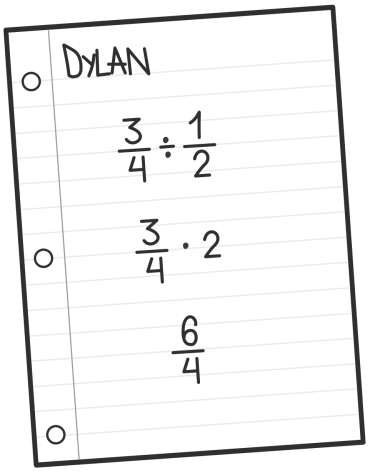
Unit 6.4, Lesson 8: Notes Name _____

My Notes

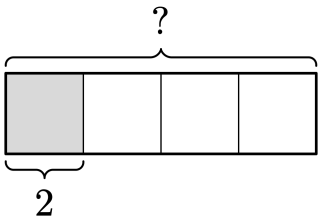
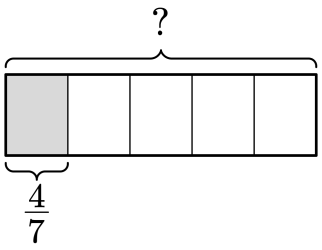
1. Dylan used the following strategy to determine $\frac{3}{4} \div \frac{1}{2}$.

   Explain his strategy.



Dylan multiplied $\frac{3}{4}$ by 2 because there are 2 groups of $\frac{1}{2}$ that make up 1 whole. This works for any unit fraction.

Complete each row in the table.

	Tape Diagram	Expression	Answer
2.3		$2 \div \frac{1}{4}$	8
2.4		$\frac{4}{7} \div \frac{1}{5}$	$\frac{20}{7}$

Summary

- ☐ I can make connections between tape diagrams and expressions when the amount in each group is unknown.
- ☐ I can explain why dividing by a unit fraction like $\frac{1}{3}$ has the same value as multiplying by a whole number, like 3.

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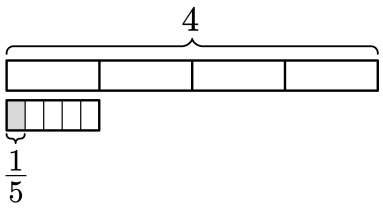
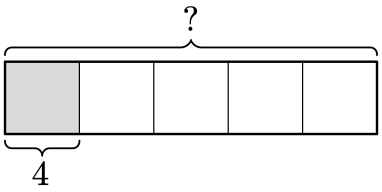
Unit 6.4, Lesson 9: Notes Name _____

My Notes

Alina and Darryl drew diagrams to calculate $4 \div \frac{1}{5}$.

Alina's Diagram	Darryl's Diagram
	

1.1 Which diagram do you find more helpful? Explain your thinking.

Explanations vary.

1.2 Which diagram would you find more helpful to calculate $\frac{3}{2} \div \frac{4}{5}$? Explain your thinking.

Explanations vary

1.3 Calculate $4 \div \frac{1}{5}$.	1.4 Calculate $\frac{3}{2} \div \frac{4}{5}$.
20	$\frac{15}{8}$ (or equivalent)

Summary

- ☐ I can calculate the quotient of two fractions and explain my strategy.
- ☐ I can compare and contrast two strategies for dividing fractions.

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Unit 6.4, Lesson 10: Notes Name _____

My Notes

Marquis walked $\frac{3}{4}$ of a mile, which is $\frac{2}{5}$ of the distance between his home and school.

1.1 Write an expression to represent the total distance between Marquis's home and school.

$\frac{3}{4} \div \frac{2}{5}$

1.2 Calculate the total distance.

$\frac{15}{8}$ **miles**

Write your own question that can be represented by the expressions in the table.

Expression	Question
2.1 $6 \div \frac{2}{3}$	***Responses vary.***
2.2 $2\frac{1}{2} \div \frac{1}{4}$	***Responses vary.***

Summary

- ☐ I can solve problems involving division of fractions by fractions in context.
- ☐ I can write my own problem to represent a division expression.

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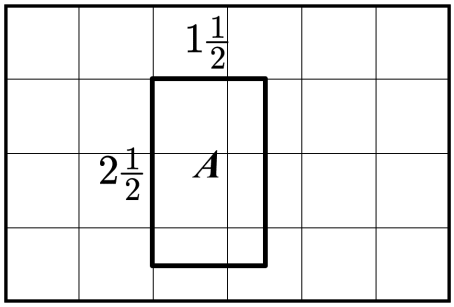
Unit 6.4, Lesson 12: Notes Name _____

My Notes

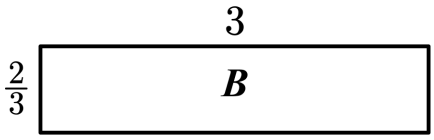
Determine the areas of rectangle A and rectangle B.

1.1 Rectangle A
Area (sq. units)



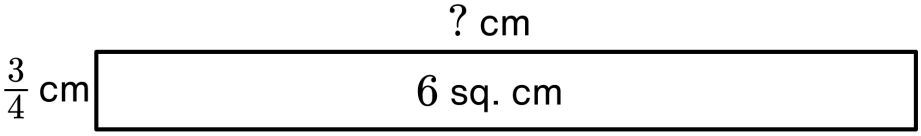
$3\frac{3}{4}$ (or equivalent)

1.2 Rectangle B
Area (sq. units)



$\frac{6}{3}$ (or equivalent)

2. Use any strategy to determine the value of the "?".



Strategies vary

8 cm

Summary

- ☐ I can calculate the area of a rectangle with lengths that are fractions.
- ☐ I can use division and multiplication to solve problems about areas of rectangles with lengths that are fractions.