

# Interim Assessment 1

## Mathematics

### Grade 6

student: \_\_\_\_\_

teacher: \_\_\_\_\_

school: \_\_\_\_\_



**DIRECTIONS**

In this assessment you will answer a total of 29 questions, including 4 constructed-response question(s). Mark all of your answers to the questions on the answer sheet provided.

You may use this test booklet to work out the questions, but remember to mark all of your answers on the answer sheet. For constructed-response questions, record your answers directly on the page in the test booklet.

**Calculator Section**

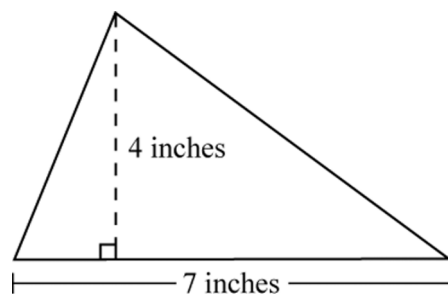
You may use a calculator to solve the questions in this section.



1. What is 35% of 80?

- A. 15
- B. 24
- C. 28
- D. 52

2. What is the area, in square inches, of the figure below?



(Figure not drawn to scale.)

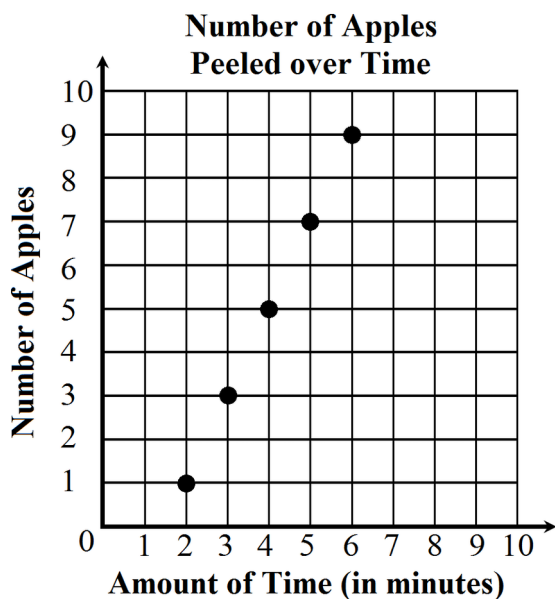
- A. 11
- B. 14
- C. 28
- D. 56

3. How many **quarts**, rounded to the nearest tenth, are in 50 liters?
- A. 3.3
  - B. 13.2
  - C. 47.3
  - D. 52.8

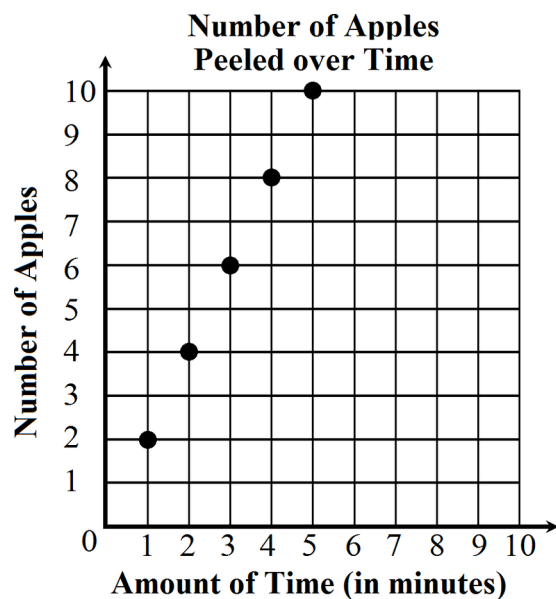
4. Ethan is peeling apples to make applesauce. He plots the relationship between the amount of time he spends and the number of apples that he peels. It takes him about 2 minutes to peel 1 apple.

Which coordinate plane contains the points that best represent this relationship?

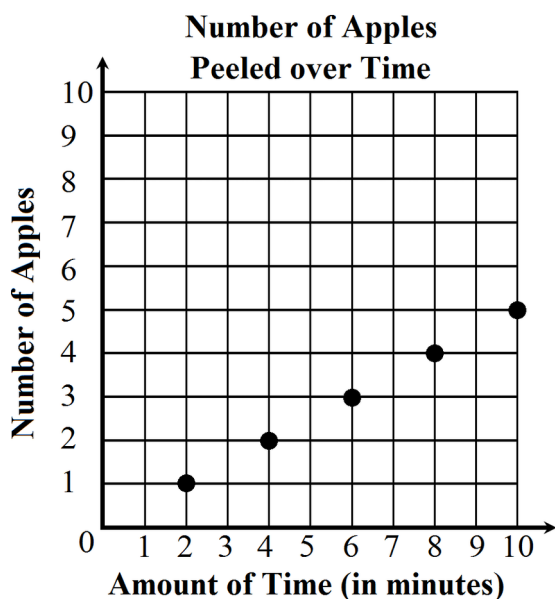
A.



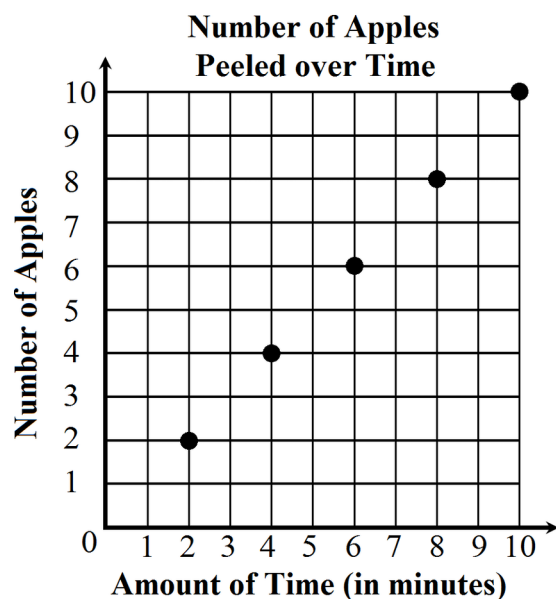
C.



B.



D.

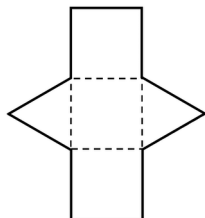


5. Which nets match Figure *G*, shown below?

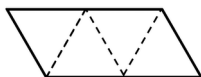
Select **all** that apply.



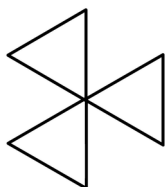
A.



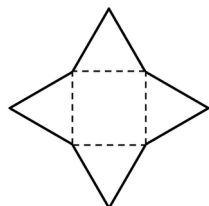
B.



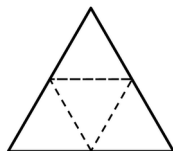
C.



D.



E.



6. Langston has 45 greeting cards. He gives 18 of the cards to his friends.

What percent of his greeting cards does he give to his friends?

- A. 18%
- B. 40%
- C. 60%
- D. 67%

7. Yavonee reads 14 pages in 28 minutes.

At this rate, how many pages does she read in 50 minutes?

- A. 25
- B. 28
- C.  $50\frac{1}{2}$
- D. 100

8. It costs \$11 for 15 granola bars.

What is the unit price, in dollars per granola bar, rounded to the nearest hundredth?

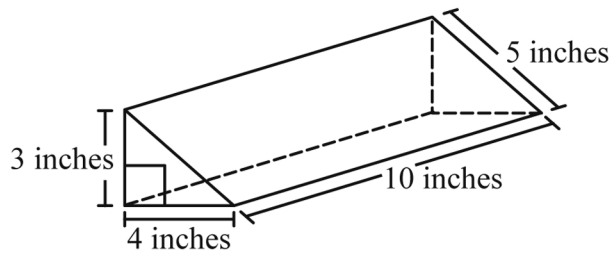
- A. 0.73
- B. 1.36
- C. 3.67
- D. 4
9. The table below represents equivalent ratios.

8	10
12	15
24	30
$m$	40

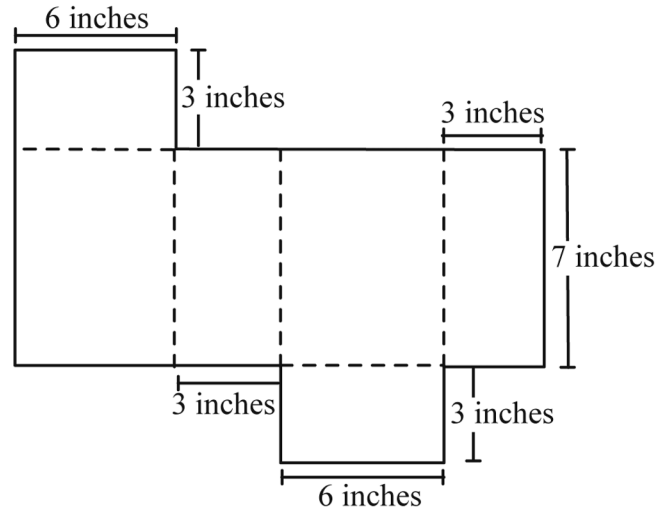
What is the value of  $m$  in the table?

- A. 28
- B. 32
- C. 34
- D. 36

10. Kristen and Marina are making prisms out of cardboard using the designs shown below.



**Kristen's Design**



**Marina's Design**

The figures are not drawn to scale.

Whose design uses more cardboard, and by how many square inches? Show how you determined your answer.

Respond in the space provided.

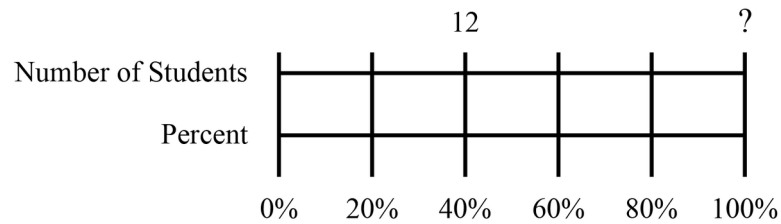


- 11.** In 7 days, Alexander spends a total of 13 hours rehearsing for the concert.

At what rate, in hours per day, does Alexander rehearse, rounded to the nearest hundredth?

- A.** 0.54
- B.** 1.86
- C.** 7
- D.** 91

12. The double number line below shows the number of students in Mr. Fulton's class. It shows the number of students that represents 40% of students in Mr. Fulton's class.



How many students are in Mr. Fulton's class?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

13. The distance from Shreveport, Louisiana, to Jackson, Mississippi, is 354 kilometers.

What is the **closest** approximation of how many **miles** apart these two cities are?

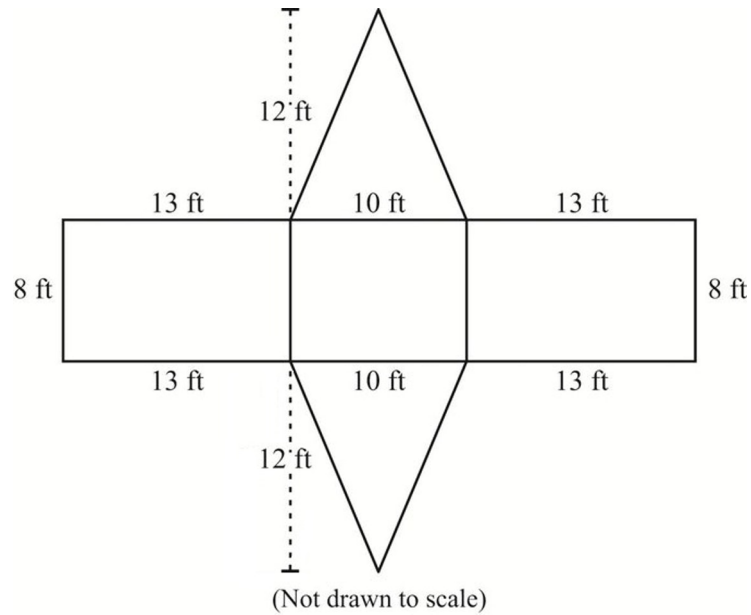
- A. 177
- B. 219
- C. 354
- D. 571

14. At a grocery store, the price of 3 cans of soup is \$6.90.

At this rate, how much would 10 cans of soup cost?

- A. \$4.30
- B. \$13.90
- C. \$20.70
- D. \$23.00

15. What is the total surface area, in square feet, of the net shown below?



Respond in the space provided.

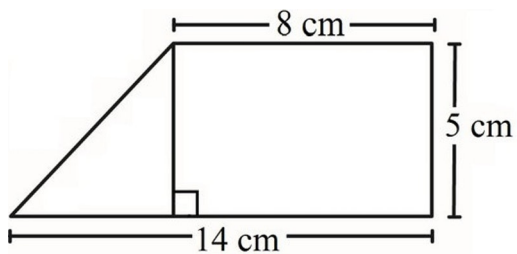
*If your test is on paper, write your answer on the answer sheet.*

16. At a craft store, 20 yards of ribbon cost \$24.

Which of the following statements is true?

- A. The ribbon costs \$0.10 per inch.
- B. The ribbon costs \$0.40 per foot.
- C. The ribbon costs \$0.83 per foot.
- D. The ribbon costs \$1.20 per inch.

17. Figure A is shown below.



(Figure not drawn to scale.)

What is the area, in square centimeters, of Figure A?

- A. 40
- B. 55
- C. 70
- D. 75

**18.** Nick is planning to drive across the country, and he is deciding between a southern route and a northern route. He uses the following pieces of information to determine the total cost of gasoline for each route:

- His car needs 18 gallons of gasoline for every 396 miles driven.
- The southern route is 3,102 miles long, and the average cost of gasoline along this route is \$2.20 per gallon of gasoline.
- The northern route is 2,948 miles long, and the average cost of gasoline along this route is \$2.28 per gallon of gasoline.

What would be the total cost of gasoline for each route? Show your work.

Respond in the space provided.

**Non-Calculator Section**

You may **not** use a calculator to solve the questions in this section.



19. Which situation describes a car that can travel 40 miles per gallon of gasoline?
- A. A car can travel 2 miles on 80 gallons of gasoline.
  - B. A car can travel 42 miles on 2 gallons of gasoline.
  - C. A car can travel 80 miles on 2 gallons of gasoline.
  - D. A car can travel 80 miles on 40 gallons of gasoline.

20. Derek buys 4 apples for every 5 oranges he buys.

Which ratio represents the ratio of oranges to the total number of fruit?

- A. 4:5
- B. 5:4
- C. 5:9
- D. 9:5

21. The tables below represent different ratios of teaspoons of sugar to ounces of iced tea.

Which table represents the greatest ratio of sugar-to-iced tea?

A.

Sugar (tsp.)	Iced Tea (oz.)
6	24
12	48
15	60

B.

Sugar (tsp.)	Iced Tea (oz.)
3	18
4	24
6	36

C.

Sugar (tsp.)	Iced Tea (oz.)
1	3
5	15
8	24

D.

Sugar (tsp.)	Iced Tea (oz.)
7	24
14	48
28	96

22. Mariah and Clarence are planning for a dinner party. The grocery store is selling a 25-pound turkey for \$60.
- Mariah states, “that means it costs \$2.40 per pound of turkey.”
  - Clarence states, “that means 2.4 pounds of turkey cost \$1.”

Is Mariah’s statement, Clarence’s statement, both statements, or neither statement correct? Justify your answer.

Respond in the space provided.



23. In the sixth grade, all students either ride the bus to school or walk to school. There are 32 students who ride the bus to school for every 16 students who walk to school.

Which statements are true?

Select **all** that apply.

- A. There are 16 students who ride the bus to school for every 1 student who walks to school.
  - B. For every 8 students who ride the bus to school there are 4 students who walk to school.
  - C. The ratio of students who ride the bus to school to students who walk to school is 8 to 16.
  - D. The ratio 2:1 describes the number of students who ride the bus to school to the total number of students.
  - E. The ratio 8:24 describes the number of students who walk to school to the total number of students.
24. Which expression is equivalent to  $45 + 27$ ?

- A.  $9(5 \times 3)$
- B.  $9(5 + 3)$
- C.  $(9 \times 5) \times (9 \times 3)$
- D.  $(9 + 5) \times (9 + 3)$

25. Sophia is making brownies. Her recipe uses a ratio of 3 cups of sugar to 2 cups of cocoa powder.

Which sentence **best** describes this situation?

- A. Sophia needs  $\frac{2}{3}$  cup of cocoa powder for 2 cups of sugar.
- B. Sophia needs  $\frac{2}{3}$  cup of sugar for 3 cups of cocoa powder.
- C. Sophia needs  $\frac{3}{2}$  cups of cocoa powder for each cup of sugar.
- D. Sophia needs  $\frac{3}{2}$  cups of sugar for each cup of cocoa powder.

- 26.** In the 7th grade, there are 84 students who are either gymnasts or hockey players. 24 of the students are gymnasts, and the rest are hockey players.

Which statement is true?

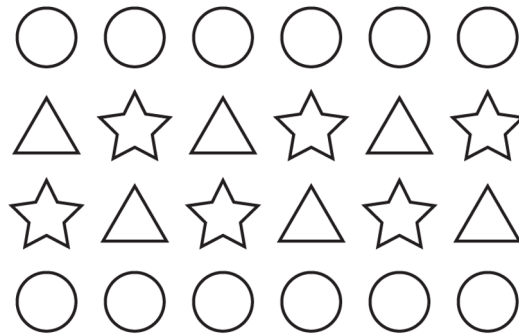
- A.** For every 5 hockey players, there are 2 gymnasts.
  - B.** For every 5 gymnasts, there are 2 hockey players.
  - C.** For every 7 hockey players, there are 2 gymnasts.
  - D.** For every 7 gymnasts, there are 5 hockey players.
- 27.** Which pair of numbers has a least common multiple of 24?
- A.** 4 and 6
  - B.** 4 and 12
  - C.** 6 and 8
  - D.** 24 and 48

- 28.** Nick bought raffle tickets to try to win a prize. He paid \$3.00 for 12 tickets.

What is the cost per raffle ticket?

- A.** \$0.20 per ticket
- B.** \$0.25 per ticket
- C.** \$4.00 per ticket
- D.** \$5.00 per ticket

29. Leo creates the following design using stars, circles, and triangles.



Based on the design shown above, write a ratio relating two of the shapes and describe the ratio relationship.

Respond in the space provided.

# Assessment Analysis Guide

## Interim Assessment 1

### Mathematics

### Grade 6

1

**Item Id: i138146****Item Type: Selected Response**

Standards Description:

6.RP.A.3.c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Primary Standard: cc:6.RP.A.3.c

Points Possible: 1

What is 35% of 80?

- A. 15 Student subtracted 65 from 80 because 35% is 65 percentage points less than 100%, OR student thought that since 35% of 100 is 35 and 80 is 20 less than 100, 35% of 80 must be 20 less than 35.
- B. 24 Student found 30% of 80; possibly found 10% and multiplied it by 3, but forgot to add an additional 5%.
- C. 28 Correct.
- D. 52 Student attempted to find 65% less than 80, but only found 65% of 80.

**Item Id: i112316****Item Type: Selected Response**

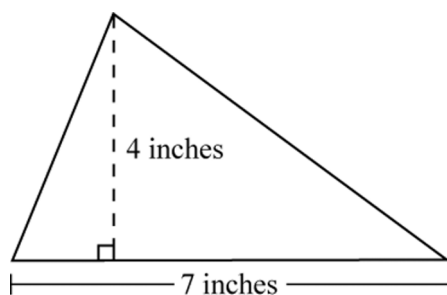
Standards Description:

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.1

Points Possible: 1

What is the area, in square inches, of the figure below?



(Figure not drawn to scale.)

- A. 11 Student may have thought that the area of a triangle was found by adding the base and the height.
- B. 14 Correct.
- C. 28 Student found the product of the base and the height but did not multiply by  $1/2$ .
- D. 56 Student may have thought that the area of a triangle was found by doubling the product of the base and the height.

3

**Item Id: i138370****Item Type: Selected Response**

Standards Description:

6.RP.A.3.d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Primary Standard: cc:6.RP.A.3.d

Points Possible: 1

How many **quarts**, rounded to the nearest tenth, are in 50 liters?

- A. 3.3 Student converted 50 liters to gallons (13.2 gallons), but then divided by 4, instead of multiplied by 4, to convert gallons to quarts ( $13.2 \div 4$ ).
- B. 13.2 Student converted 50 liters to gallons but did not convert gallons to quarts.
- C. 47.3 Student divided, instead of multiplied, to convert 50 liters into gallons ( $50 \div 0.264$ ) and then divided by 4, instead of multiplied by 4, to convert to quarts.
- D. 52.8 Correct.

**Item Id: i112520**

**Item Type: Selected Response**

Standards Description:

6.RP.A.3.a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

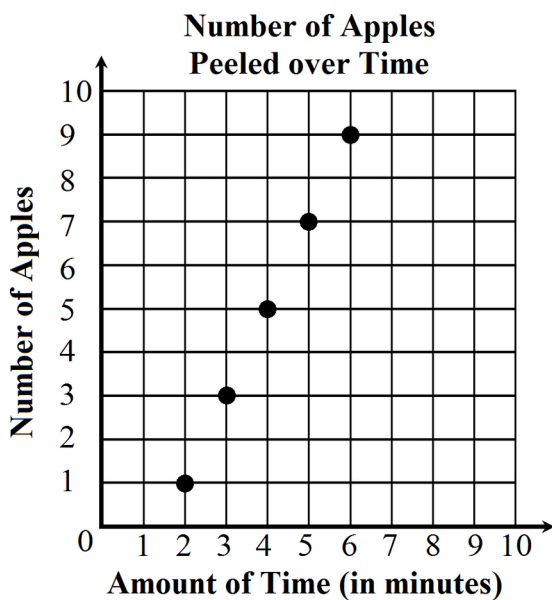
Primary Standard: cc:6.RP.A.3.a

Points Possible: 1

Ethan is peeling apples to make applesauce. He plots the relationship between the amount of time he spends and the number of apples that he peels. It takes him about 2 minutes to peel 1 apple.

Which coordinate plane contains the points that best represent this relationship?

A.

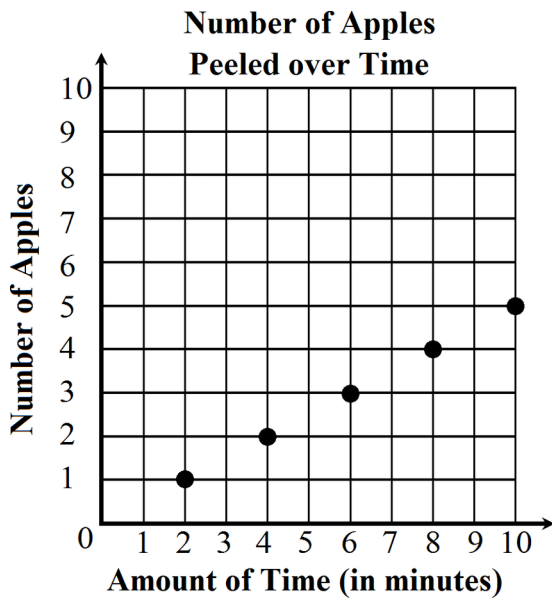


Student chose the graph that correctly has the first point at (2, 1), but used a rate of 2 apples for every minute instead of 2 minutes for every apple after minute 2.



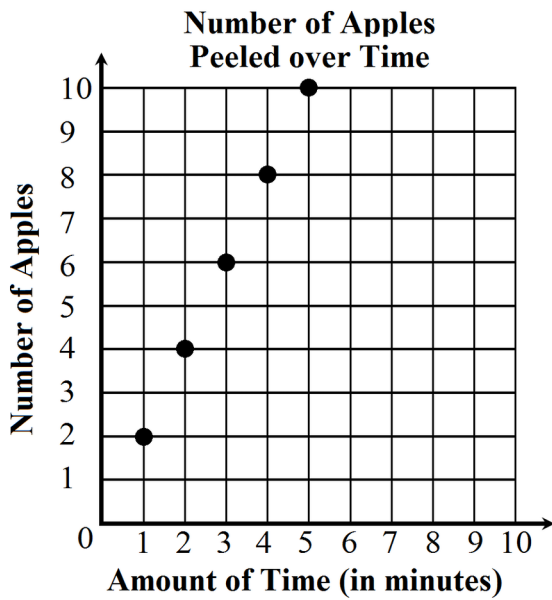
B.

Correct.

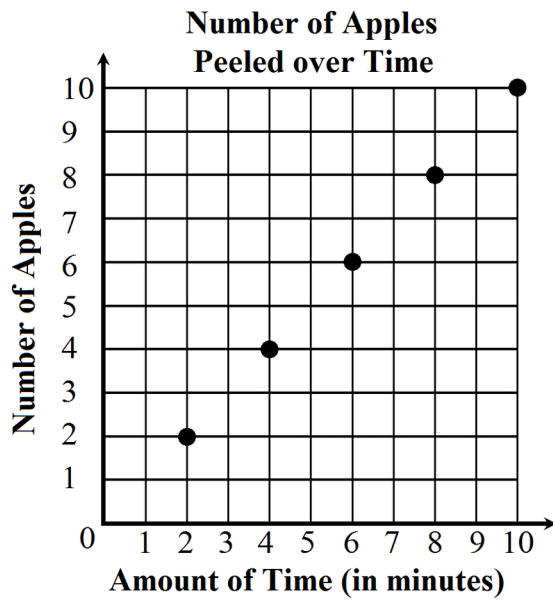


C.

Student chose the graph that shows that 2 apples were peeled per minute (reversed the variables).



D.



Student chose the graph where 2 apples were peeled per 2 minutes, and the number of apples and number of minutes increased by 2 for each data point.

**Item Id: i114396****Item Type: Multiple Select**

Standards Description:

6.G.A.4

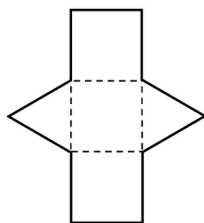
Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.4

Points Possible: 1

Which nets match Figure *G*, shown below?Select **all** that apply.**Figure *G***

A.



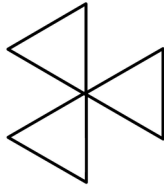
Student thought that the net of a triangular prism is the same as the net of a triangular pyramid; perhaps confused because the triangular prism has two triangles.

B.

Correct.

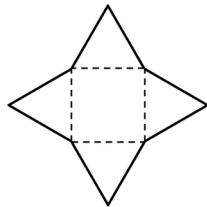


C.



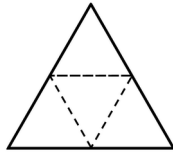
Student thought that the net of a triangular pyramid has three triangles instead of four.

D.



Student thought that the net of a square pyramid is the same as the net of a triangular pyramid; perhaps confused because the square pyramid and the triangular pyramid both have four triangles.

E.



Correct.

6

**Item Id: i138164****Item Type: Selected Response**

Standards Description:

6.RP.A.3.c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Primary Standard: cc:6.RP.A.3.c

Points Possible: 1

Langston has 45 greeting cards. He gives 18 of the cards to his friends.

What percent of his greeting cards does he give to his friends?

A. 18%

Student chose the number of cards Langston gives to his friends as the percent of cards.

**B. 40%**

Correct.

C. 60%

Student calculated the percent based on the ratio of the number of cards left to the total number of cards (27/45).

D. 67%

Student calculated the percent based on the ratio of the number of cards Langston gives to his friends to the number of cards left (divided 18/27 and rounded to the nearest hundredth).

**Item Id: i138165****Item Type: Selected Response**

Standards Description:

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Primary Standard: cc:6.RP.A.3

Points Possible: 1

Yavonee reads 14 pages in 28 minutes.

At this rate, how many pages does she read in 50 minutes?

- A. 25 Correct.
- B. 28 Student recognized that 50 minutes is about twice as much as 28 minutes and estimated that twice as many pages as 14 would be read in 50 minutes.
- C.  $50\frac{1}{2}$  Student found the unit rate of  $\frac{1}{2}$  page per minute but then added 50 instead of multiplying by 50.
- D. 100 Student found the unit rate of minutes per page, instead of pages per minute, and multiplied it by 50 minutes.

8

**Item Id: i129735****Item Type: Selected Response**

Standards Description:

6.RP.A.3.b Solve unit rate problems including those involving unit pricing and constant speed.

Primary Standard: cc:6.RP.A.3.b

Points Possible: 1

It costs \$11 for 15 granola bars.

What is the unit price, in dollars per granola bar, rounded to the nearest hundredth?

A. 0.73

Correct.

B. 1.36

Student found the unit rate of granola bars per dollar, instead of dollars per granola bar.

C. 3.67

Student did not recognize that the unit price refers to the price of 1 granola bar; simplified the ratio of \$11/15 bars to \$3.67/5 bars and chose an answer that represents the cost of 5 granola bars.

D. 4

Student did not recognize they needed to find the unit rate; found the difference between the numbers given.

9

**Item Id: i112425****Item Type: Selected Response**

Standards Description:

6.RP.A.3.a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

Primary Standard: cc:6.RP.A.3.a

Points Possible: 1

The table below represents equivalent ratios.

8	10
12	15
24	30
$m$	40

What is the value of  $m$  in the table?

- A. 28  
Student found the next number that is a multiple of 4, recognizing the pattern in the first two x-values in the table.
- B. 32  
Correct.
- C. 34  
Student observed that in the row above  $m$ , the x to y relationship was  $24 + 6 = 30$ , and used the same rule.
- D. 36  
Student noticed a difference of 12 between 12 and 24 and applied the same rule to 24.



10
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**Item Id: i129122****Item Type: Constructed Response**

Standards Description:

6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Standard(s) for Mathematical Practice:

MP1 Make sense of problems and persevere in solving them.

In this item, students must look for entry points in order to answer the question; students must plan a solution pathway which includes analyzing the given values and identifying the individual shapes that make up the compound figures.

MP7 Look for and make use of structure.

Students make use of the structure of triangular prisms when determining the surface area of Kristen's design; they represent the three-dimensional figure using a two-dimensional net in order to calculate the surface area.

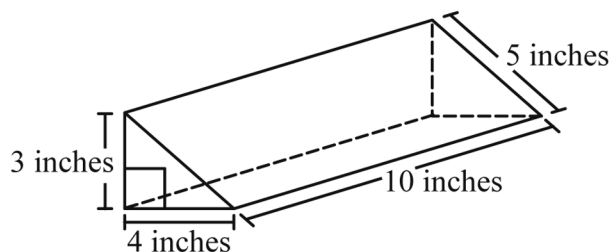
MP8 Look for and express regularity in repeated reasoning.

Students recognize that several of the polygons share the same dimensions and, therefore, share the same areas; this allows students to look for shortcuts in determining the total surface area of each design.

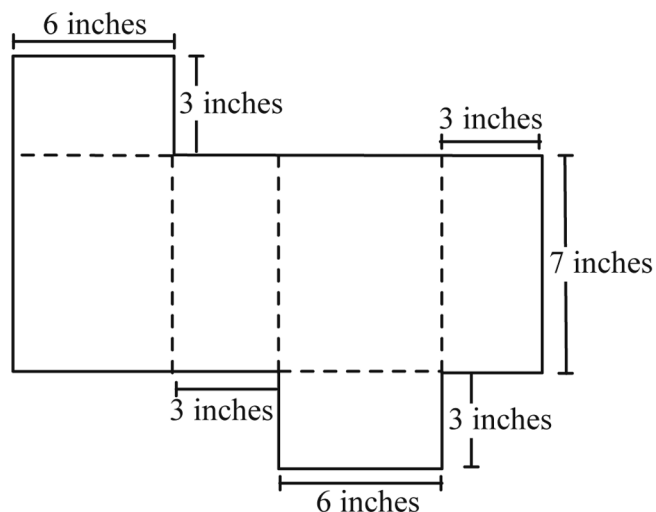
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**Primary Standard: cc:6.G.A.4****Points Possible: 4**

Kristen and Marina are making prisms out of cardboard using the designs shown below.



Kristen's Design



Marina's Design

The figures are not drawn to scale.

Whose design uses more cardboard, and by how many square inches? Show how you determined your answer.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

**Kristen's Design:**

Area of side triangle ( $\times 2$ )

$$A = \frac{1}{2}(b \times h)$$

$$A = \frac{1}{2}(4 \times 3)$$

$$A = \frac{1}{2}(12)$$

$$A = 6 \text{ square inches}$$

$$6 \times 2 = 12 \text{ square inches}$$

Area of front rectangle

$$A = l \times w$$

$$A = 10 \times 5$$

$$A = 50 \text{ square inches}$$

Area of back rectangle

$$A = l \times w$$

$$A = 10 \times 3$$

$$A = 30 \text{ square inches}$$

Area of base rectangle

$$A = l \times w$$

$$A = 10 \times 4$$

$$A = 40 \text{ square inches}$$

Total surface area of Kristen's net

$$12 + 50 + 30 + 40 = 132 \text{ square inches}$$

**Marina's Design:**

Area of 6-inch by 3-inch rectangle ( $\times 2$ )

$$A = l \times w$$

$$A = 6 \times 3$$

$$A = 18 \text{ square inches}$$

$$18 \times 2 = 36 \text{ square inches}$$

Area of 6-inch by 7-inch rectangle ( $\times 2$ )

$$A = l \times w$$

$$A = 6 \times 7$$

$$A = 42 \text{ square inches}$$

$$42 \times 2 = 84 \text{ square inches}$$

Area of 3-inch by 7-inch rectangle ( $\times 2$ )

$$A = l \times w$$

$$A = 3 \times 7$$

$$A = 21 \text{ square inches}$$

$$21 \times 2 = 42 \text{ square inches}$$

Total Surface Area

$$36 + 84 + 42 = 162 \text{ square inches}$$

Difference between area of Marina's and Kristen's designs

$$162 - 132 = 30 \text{ square inches}$$

Marina's design uses 30 square inches more of cardboard.

**Evidence Statement(s):**

1. Student represented Kristen's three-dimensional figure using rectangles and triangles.
2. Student used the rectangles and triangles of Kristen's design to determine the surface area of the three-dimensional figure.
3. Student used the net of Marina's design to determine the surface area of the figure.
4. Student used their calculations of the surface areas of the two figures to determine whose design uses more cardboard and by how much.

**Common Misconception(s):**

- Student did not accurately represent Kristen's three-dimensional design using rectangles and triangles; may have used the incorrect number of triangles and rectangles, or their incorrect dimensions, to calculate the total surface area.
- Student thought that the 3 rectangles in Kristen's design had the same dimensions.
- Student thought that all of the rectangles in Marina's design had the same dimensions.
- Student found the perimeter of each design, instead of the surface area.

**Item Id: i129737****Item Type: Selected Response**

Standards Description:

6.RP.A.3.b Solve unit rate problems including those involving unit pricing and constant speed.

Primary Standard: cc:6.RP.A.3.b

Points Possible: 1

In 7 days, Alexander spends a total of 13 hours rehearsing for the concert.

At what rate, in hours per day, does Alexander rehearse, rounded to the nearest hundredth?

A. 0.54

Student found the unit rate of days per hour, instead of hours per day, and rounded to the nearest hundredth.

**B. 1.86**

Correct.

C. 7

Student did not recognize that they needed to find the unit rate; found the additive relationship between 7 and 1 days and applied it to hours (13 - 6).

D. 91

Student did not recognize that they needed to find the unit rate and multiplied hours by days; may have thought that "per" meant multiply.

12

**Item Id: i138161****Item Type: Math Short Answer**

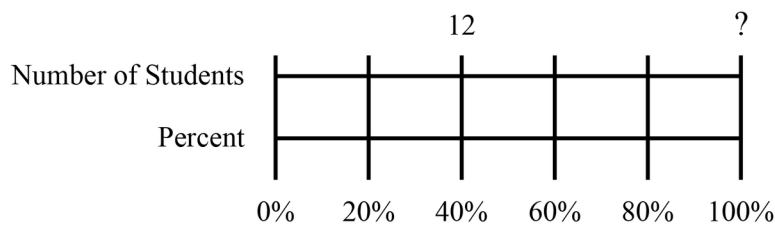
Standards Description:

6.RP.A.3.c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Primary Standard: cc:6.RP.A.3.c

Points Possible: 1

The double number line below shows the number of students in Mr. Fulton's class. It shows the number of students that represents 40% of students in Mr. Fulton's class.



How many students are in Mr. Fulton's class?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

**Correct Answer:**

30 students

**Item Id: i138377****Item Type: Selected Response**

Standards Description:

6.RP.A.3.d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Primary Standard: cc:6.RP.A.3.d

Points Possible: 1

The distance from Shreveport, Louisiana, to Jackson, Mississippi, is 354 kilometers.

What is the **closest** approximation of how many **miles** apart these two cities are?

A. 177

Student used a conversion factor of  $1 \text{ mi} = 2 \text{ km}$  (perhaps rounded because of the use of "approximation").

**B. 219**

Correct.

C. 354

Student chose an answer that incorrectly shows a 1:1 ratio for miles to km; perhaps incorrectly rounded 0.62 miles up to 1 mile in the miles to km ratio of 0.62:1.

D. 571

Student set up ratios incorrectly and divided 354 by 0.62.

**Item Id: i138111****Item Type: Selected Response**

Standards Description:

6.RP.A.3.b Solve unit rate problems including those involving unit pricing and constant speed.

Primary Standard: cc:6.RP.A.3.b

Points Possible: 1

At a grocery store, the price of 3 cans of soup is \$6.90.

At this rate, how much would 10 cans of soup cost?

A. \$4.30

Student found the unit rate of cans per dollar (rounded to the nearest hundredth, 0.43) and multiplied it by 10 to find the cost of 10 cans.

B. \$13.90

Student did not recognize that they needed to find the unit rate; found the additive relationship between 3 and 10 and added it to \$6.90.

C. \$20.70

Student did not recognize that they needed to find the unit rate; estimated that 10 was about three times as much as 3 and multiplied \$6.90 by 3.

**D. \$23.00****Correct.**



15

Item Id: i114397

Item Type: Math Short Answer

Standards Description:

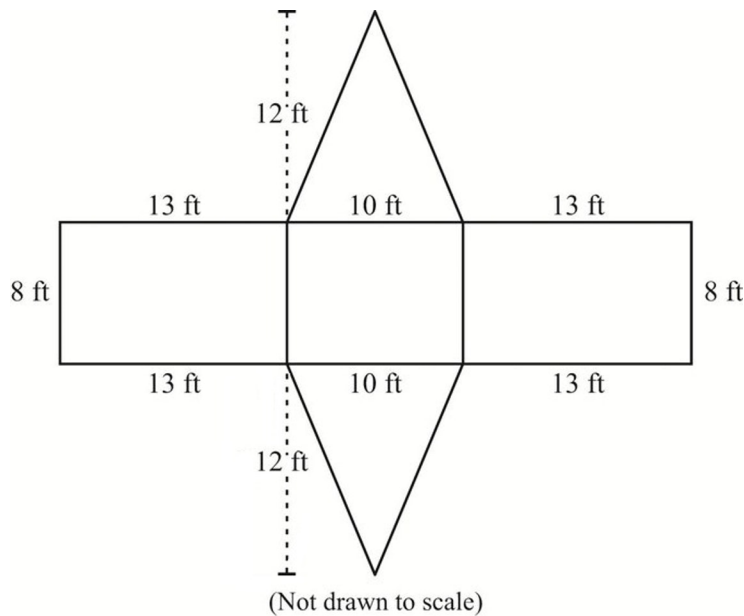
6.G.A.4

Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.4

Points Possible: 1

What is the total surface area, in square feet, of the net shown below?



Respond in the space provided.

If your test is on paper, write your answer on the answer sheet.

**Correct Answer:**

408 square feet

**Item Id: i138374****Item Type: Selected Response**

Standards Description:

6.RP.A.3.d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Primary Standard: cc:6.RP.A.3.d

Points Possible: 1

At a craft store, 20 yards of ribbon cost \$24.

Which of the following statements is true?

A. The ribbon costs \$0.10 per inch.

Student converted 20 yards to 240 inches (used an incorrect conversion factor of 1 yard = 12 inches) and calculated the unit rate using the ratio \$24 to 240 inches.

**B. The ribbon costs \$0.40 per foot.**

Correct.

C. The ribbon costs \$0.83 per foot.

Student found the unit rate of yards per dollar and rounded to the nearest hundredth, ignoring units ("per foot") in the answer choice.

D. The ribbon costs \$1.20 per inch.

Student found the unit cost per yard (\$1.20) and applied that to the incorrect measurement of length ("per inch").

**Item Id: i112120****Item Type: Selected Response**

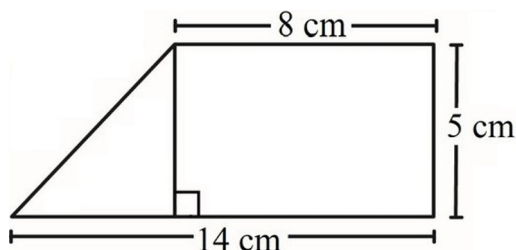
Standards Description:

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.1

Points Possible: 1

Figure A is shown below.



(Figure not drawn to scale.)

What is the area, in square centimeters, of Figure A?

- A. 40 Student found the area of the rectangle only.
- B. 55** Correct.
- C. 70 Student multiplied the length of the entire figure by the height, OR student only multiplied the base and the height of the triangle to find its area and did not divide by 2.
- D. 75 Student calculated the area of the rectangle correctly, but used 14 as the base of the triangle  $((14 \times 5)/2 = 35)$ .

**Item Id: i129006****Item Type: Constructed Response**

Standards Description:

6.RP.A.3.b Solve unit rate problems including those involving unit pricing and constant speed.

Standard(s) for Mathematical Practice:

MP1 Make sense of problems and persevere in solving them.

As they solve a single-prompt problem without scaffolding, students must start by understanding the meaning of the context and looking for an entry point to the solution. They must determine how to use the information given to plan a solution pathway.

Primary Standard: cc:6.RP.A.3.b

Secondary Standard(s): cc:6.RP.A.2

Points Possible: 4

Nick is planning to drive across the country, and he is deciding between a southern route and a northern route. He uses the following pieces of information to determine the total cost of gasoline for each route:

- His car needs 18 gallons of gasoline for every 396 miles driven.
- The southern route is 3,102 miles long, and the average cost of gasoline along this route is \$2.20 per gallon of gasoline.
- The northern route is 2,948 miles long, and the average cost of gasoline along this route is \$2.28 per gallon of gasoline.

What would be the total cost of gasoline for each route? Show your work.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

Unit Rate

$$396 \div 18 = 22$$

22 miles per gallon

Southern Route

$$3,102 \div 22 = 141$$

141 gallons needed

$$141 \times 2.20 = 310.20$$

The total cost of gasoline along the southern route would be \$310.20.

Northern Route

$$2,948 \div 22 = 134$$

134 gallons needed

$$134 \times 2.28 = 305.52$$

The total cost of gasoline along the northern route would be \$305.52.

**Evidence Statement(s):**

1. Student used the rate given to determine the gallons of gasoline needed to travel the southern route and the total cost.
2. Student used the rate given to determine the gallons of gasoline needed to travel the northern route and the total cost.

**Common Misconception(s):**

- Student used an additive relationship instead of a multiplicative relationship when determining the unit rate that represents the miles per gallon the car can travel.
- Student correctly determined the unit rate that represents the miles per gallon the car can travel, but multiplied that value (22) by the average cost of gasoline per gallon for each route; student did not account for the total distance in miles for each route.

**Item Id: i112013****Item Type: Selected Response**

Standards Description:

6.RP.A.2 Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship.

Primary Standard: cc:6.RP.A.2

Points Possible: 1

Which situation describes a car that can travel 40 miles per gallon of gasoline?

- A. A car can travel 2 miles on 80 gallons of gasoline. Student confused the units; used 80 gallons instead of 80 miles and 2 miles instead of 2 gallons.
- B. A car can travel 42 miles on 2 gallons of gasoline. Student subtracted the number of gallons from the number of miles ( $42 - 2$ ) and thought this meant traveling 40 miles per gallon of gasoline.
- C. A car can travel 80 miles on 2 gallons of gasoline. Correct.**
- D. A car can travel 80 miles on 40 gallons of gasoline. Student chose a statement representing a car that can travel 2 miles per gallon of gasoline.

20
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**Item Id: i111744****Item Type: Selected Response**

Standards Description:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Primary Standard: cc:6.RP.A.1

Points Possible: 1

Derek buys 4 apples for every 5 oranges he buys.

Which ratio represents the ratio of oranges to the total number of fruit?

- |        |   |
|--------|---|
| A. 4:5 | Student represented the number of apples to the number of oranges; represented the numbers in the order that they appeared in the question context. |
| B. 5:4 | Student represented the number of oranges to the number of apples.  |
| C. 5:9 | Correct.  |
| D. 9:5 | Student represented the total number of pieces of fruit to the number of oranges.   |

**Item Id: i132464****Item Type: Selected Response**

Standards Description:

6.RP.A.3.a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

Primary Standard: cc:6.RP.A.3.a

Points Possible: 1

The tables below represent different ratios of teaspoons of sugar to ounces of iced tea.

Which table represents the greatest ratio of sugar-to-iced tea?

A.

Sugar (tsp.)	Iced Tea (oz.)
6	24
12	48
15	60

Student found the additive relationship between tsp. of sugar and oz. of iced tea by looking at the first row of each table, and chose the one with the greatest additive relationship (+18), OR student identified the two tables that listed 6 tsp. of sugar and compared them, choosing the one that had the lesser corresponding amount of iced tea.

B.

Sugar (tsp.)	Iced Tea (oz.)
3	18
4	24
6	36

Student found the unit rate of oz. of iced tea to tsp. of sugar for all four tables but confused the quantities and chose the unit rate with the greatest ratio of oz. of iced tea to tsp. of sugar (6:1), OR student found the unit rate of tsp. of sugar to oz. of iced tea for all four tables and thought that 1:6 was the greatest ratio.

C.

Sugar (tsp.)	Iced Tea (oz.)
1	3
5	15
8	24

Correct.



D.

<b>Sugar (tsp.)</b>	<b>Iced Tea (oz.)</b>
7	24
14	48
28	96

Student thought the table with the highest values of tsp. of sugar and oz. of iced tea (28 tsp. and 96 oz.) had the greatest sugar-to-iced tea ratio.

**Item Id: i130806****Item Type: Constructed Response**

Standards Description:

6.RP.A.2 Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship.

Standard(s) for Mathematical Practice:

MP3 Construct viable arguments and critique the reasoning of others.

In this item, students must evaluate two lines of reasoning and justify their thinking using words and/or numbers.

Primary Standard: cc:6.RP.A.2

Points Possible: 2

Mariah and Clarence are planning for a dinner party. The grocery store is selling a 25-pound turkey for \$60.

- Mariah states, “that means it costs \$2.40 per pound of turkey.”
- Clarence states, “that means 2.4 pounds of turkey cost \$1.”

Is Mariah’s statement, Clarence’s statement, both statements, or neither statement correct? Justify your answer.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

Unit price of the turkey:

$$\frac{\$60}{25} = \frac{x}{1}$$

$$x = \$2.40$$

The unit price of the turkey is \$2.40 per 1 lb.

Mariah's statement is correct since it names the correct unit price. Clarence reversed the units and thought that 2.4 lbs cost \$1 and is therefore incorrect.

**Evidence Statement(s):**

1. Student demonstrated understanding of unit rate concepts, recognizing that the unit rate per pound is correct in Mariah's statement and the unit rate per dollar is incorrect in Clarence's statement.
2. Student justified their answer using ratio reasoning.

**Common Misconception(s):**

- Student thought Clarence was correct; did not recognize that Clarence did not accurately find the unit rate per dollar.
- Student thought that only the unit rate per dollar could be used; used the order given in context (pounds:dollars), and believed only Clarence could be correct without recognizing his inaccurate ratio reasoning.
- Student did not justify their answer using ratio reasoning.

**Item Id: i129718****Item Type: Multiple Select**

Standards Description:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Primary Standard: cc:6.RP.A.1

Points Possible: 1

In the sixth grade, all students either ride the bus to school or walk to school. There are 32 students who ride the bus to school for every 16 students who walk to school.

Which statements are true?

Select **all** that apply.

- A. There are 16 students who ride the bus to school for every 1 student who walks to school. Student calculated the difference between 32 and 16, and wrote the result as a unit rate of students who ride the bus to students who walk to school.
- B. For every 8 students who ride the bus to school there are 4 students who walk to school.** Correct.
- C. The ratio of students who ride the bus to school to students who walk to school is 8 to 16. Student switched the labels of the bus riders to walkers ratio and represented the walkers to bus riders ratio.
- D. The ratio 2:1 describes the number of students who ride the bus to school to the total number of students. Student represented the ratio of bus riders to walkers (2:1) instead of the ratio of bus riders to the total number of students (2:3).
- E. The ratio 8:24 describes the number of students who walk to school to the total number of students.** Correct.

**Item Id: i112396****Item Type: Selected Response**

Standards Description:

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

Primary Standard: cc:6.NS.B.4

Points Possible: 1

Which expression is equivalent to  $45 + 27$ ?

A.  $9(5 \times 3)$

Student correctly factored out the 9, but used multiplication instead of addition.

B.  $9(5 + 3)$

Correct.

C.  $(9 \times 5) \times (9 \times 3)$

Student correctly factored out the 9, but used multiplication instead of addition in the middle of the expression.

D.  $(9 + 5) \times (9 + 3)$

Student correctly factored out the 9, but reversed the multiplication and addition symbols.

25

**Item Id: i112658****Item Type: Selected Response**

Standards Description:

6.RP.A.2 Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship.

Primary Standard: cc:6.RP.A.2

Points Possible: 1

Sophia is making brownies. Her recipe uses a ratio of 3 cups of sugar to 2 cups of cocoa powder.

Which sentence **best** describes this situation?

A. Sophia needs  $\frac{2}{3}$  cup of cocoa powder for 2 cups of sugar.

Student found the unit rate for cocoa powder to sugar ( $2/3$ ), but used two cups of sugar instead of one.

B. Sophia needs  $\frac{2}{3}$  cup of sugar for 3 cups of cocoa powder.

Student reversed the ratio of sugar to cocoa powder and used 3 cups of cocoa powder instead of one.

C. Sophia needs  $\frac{3}{2}$  cups of cocoa powder for each cup of sugar.

Student found the correct unit rate, but switched sugar and cocoa powder in the ratio; student might have set up the proportion incorrectly.

**D. Sophia needs  $\frac{3}{2}$  cups of sugar for each cup of cocoa powder.**

Correct.

**Item Id: i129733****Item Type: Selected Response**

Standards Description:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Primary Standard: cc:6.RP.A.1

Points Possible: 1

In the 7th grade, there are 84 students who are either gymnasts or hockey players. 24 of the students are gymnasts, and the rest are hockey players.

Which statement is true?

**A. For every 5 hockey players, there are 2 gymnasts.**

Correct.

B. For every 5 gymnasts, there are 2 hockey players.

Student switched hockey players and gymnasts while expressing the ratio.

C. For every 7 hockey players, there are 2 gymnasts.

Student used the total number of students (84) for hockey players and simplified the ratio of 84:24.

D. For every 7 gymnasts, there are 5 hockey players.

Student used the total number of students (84) for gymnasts, subtracted  $84 - 24$  to find the number of hockey players (60), and simplified the ratio of 84:60.

**Item Id: i112329****Item Type: Selected Response**

Standards Description:

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

Primary Standard: cc:6.NS.B.4

Points Possible: 1

Which pair of numbers has a least common multiple of 24?

A. 4 and 6

Student chose a pair of numbers that multiply to 24, but have a least common multiple of 12.

B. 4 and 12

Student chose a pair of numbers that has 24 as a common multiple, but the least common multiple is 12; possibly did not realize one of the numbers could be the least common multiple.

**C. 6 and 8**

Correct.

D. 24 and 48

Student confused least common multiple with greatest common factor and picked a pair of numbers with a greatest common factor of 24.



28

**Item Id: i113282****Item Type: Selected Response**

Standards Description:

6.RP.A.2 Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship.

Primary Standard: cc:6.RP.A.2

Points Possible: 1

Nick bought raffle tickets to try to win a prize. He paid \$3.00 for 12 tickets.

What is the cost per raffle ticket?

A. \$0.20 per ticket

Student calculated  $3 + 12 = 15$ , 15 tickets for 3 dollars = rate of \$0.20 per ticket.

**B. \$0.25 per ticket**

Correct.

C. \$4.00 per ticket

Student calculated the rate given \$12 for 3 tickets, OR student divided to get the unit rate of the money and not the tickets.

D. \$5.00 per ticket

Student calculated  $3 + 12 = 15$ , \$15 for 3 tickets = rate of \$5 per ticket.

**Item Id: i130807****Item Type: Constructed Response**

Standards Description:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Standard(s) for Mathematical Practice:

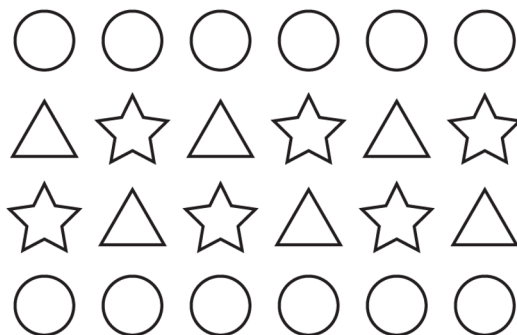
MP2 Reason abstractly and quantitatively.

In this item, when students describe a concrete scenario using a ratio and ratio language, they are representing it symbolically; they must continue to consider the units involved and attend to the meaning of the quantities.

Primary Standard: cc:6.RP.A.1

Points Possible: 2

Leo creates the following design using stars, circles, and triangles.



Based on the design shown above, write a ratio relating two of the shapes and describe the ratio relationship.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

The ratio of stars to triangles is 1:1. This means that for every 1 star, there is 1 triangle.

**Other ratios, including equivalent ratios, and descriptions using precise ratio language (e.g., "1**

**star per triangle" or "for every 1 star, there are 2 circles" or "for every 6 triangles, there are 12 circles") are also accepted.**

**Evidence Statement(s):**

1. Student used ratio language to relate the frequency of two shapes in the image: circles and stars, circles and triangles, or stars and triangles.
2. Student described the ratio relationship that they wrote.

**Common Misconception(s):**

- Student only compared two shapes from one of the rows/columns, instead of creating a ratio based on the whole image.
- Student inaccurately described the ratio relationship; did not understand what their ratio represented in the situation.

# Interim Assessment 2

## Mathematics

### Grade 6

student: \_\_\_\_\_

teacher: \_\_\_\_\_

school: \_\_\_\_\_



**DIRECTIONS**

In this assessment you will answer a total of 32 questions, including 4 constructed-response question(s). Mark all of your answers to the questions on the answer sheet provided.

You may use this test booklet to work out the questions, but remember to mark all of your answers on the answer sheet. For constructed-response questions, record your answers directly on the page in the test booklet.

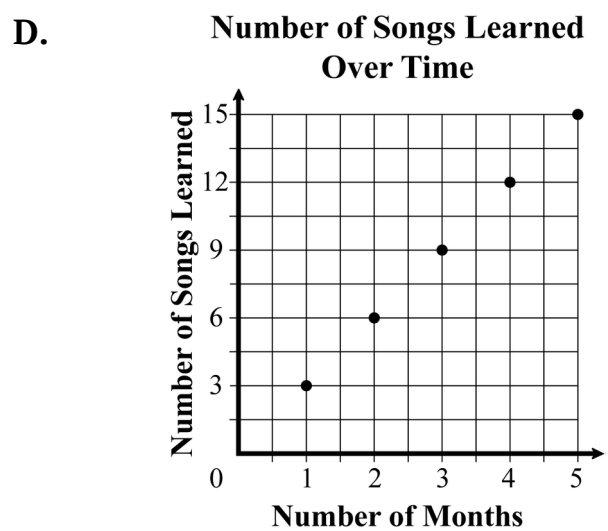
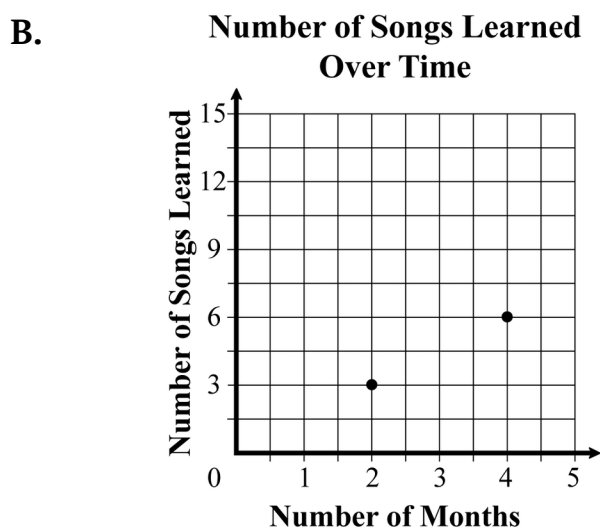
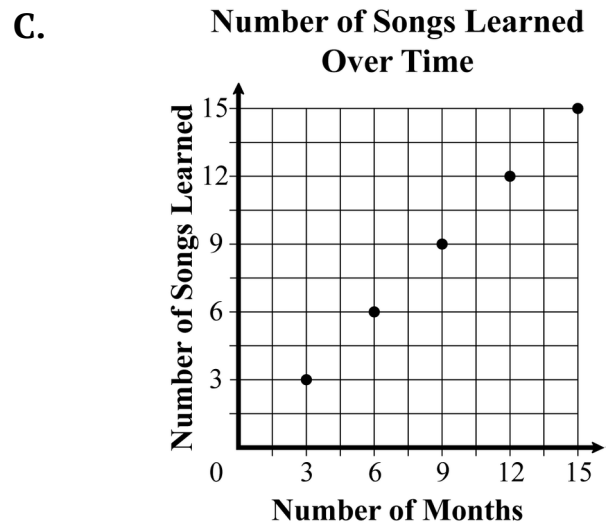
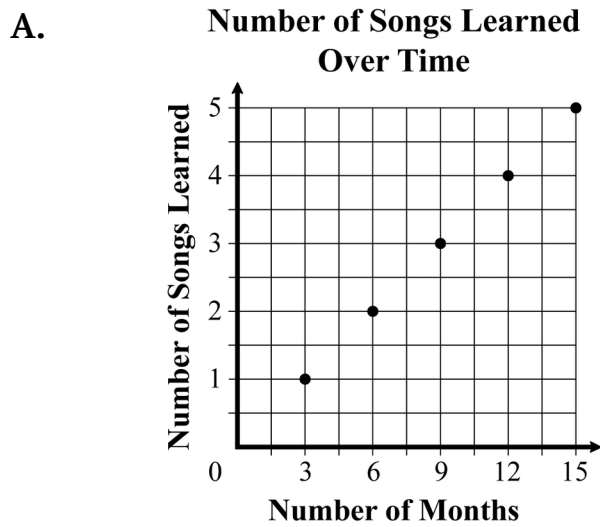
***Calculator Section***

*You may use a calculator to solve the questions in this section.*



1. Giorgio is learning to play the piano. He learns to play 3 new songs each month.

Which graph represents the total number of songs,  $y$ , he learns after  $x$  months?



2. Evaluate the expression below when  $x = 2$  and  $z = 12$ .

$$z + 5x^3$$

- A. 25
- B. 42
- C. 52
- D. 1,012
3. Tania is riding a train for 43.6 miles to get to her destination. The train has 14.3 more miles to travel before arriving at Tania's destination.

Which equation and solution correctly represent how many miles,  $m$ , the train has already traveled?

A.  $m + 14.3 = 43.6$

$$m = 29.3$$

B.  $m + 43.6 = 14.3$

$$m = 29.3$$

C.  $m + 14.3 = 43.6$

$$m = 57.9$$

D.  $43.6 + 14.3 = m$

$$m = 57.9$$



4. Which expression represents the phrase below?

*the product of 13 and the sum of a number,  $n$ , and 32*

- A.  $13 + 32n$
- B.  $13n + 32$
- C.  $13(n + 32)$
- D.  $13 \div (n + 32)$

5. Sienna is determining the solution to the equation  $6b + 12 = 102$ .

Which value is the solution to Sienna's equation?

- A. 15
  - B. 17
  - C. 90
  - D. 102
6. What is the value of the expression below when  $n = 2.4$ ?

$$4n \times 2 + 43$$

Respond in the space provided.

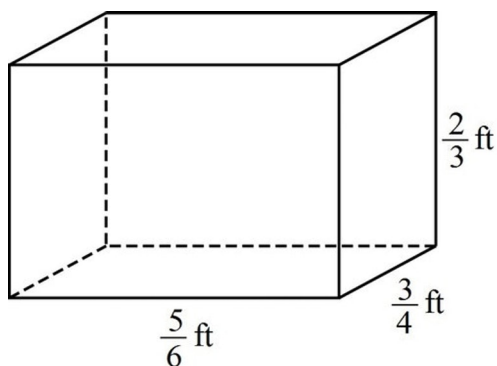
*If your test is on paper, write your answer on the answer sheet.*

7. Solve for  $x$ .

$$\frac{4}{5} = 3x$$

- A.  $\frac{4}{15}$
  - B.  $\frac{5}{12}$
  - C.  $2\frac{2}{5}$
  - D.  $3\frac{3}{4}$
8. Which expression can be described as a product of two factors?
- A.  $(1 \times 7) + 6$
  - B.  $6 \div (4 \times 4)$
  - C.  $10 - 6(7)$
  - D.  $12(4 + 5)$

9. What is the volume, in cubic feet, of the rectangular prism shown below?



(Figure not drawn to scale.)

- A.  $\frac{5}{12}$   
 B.  $\frac{5}{9}$   
 C.  $\frac{5}{8}$   
 D.  $2\frac{1}{4}$

10. Tionna folds paper cranes for party decorations. The number of hours she spends and the number of paper cranes folded are shown in the table below.

Number of Hours ( $h$ )	Number of Paper Cranes Folded ( $c$ )
1	15
2	30
3	45

Which equation represents the relationship between the number of hours,  $h$ , Tionna spends folding and the number of cranes,  $c$ , that she folds?

- A.  $c = \frac{15}{h}$   
 B.  $c = 15h$   
 C.  $h = 15c$   
 D.  $h = c + 15$

11. The formula for the volume of a cube is  $V = s^3$ , where  $s$  is the length of one side of the cube.

If  $s = \frac{1}{3}$  of a unit, what is the volume, in cubic units, of the cube?

- A.  $\frac{1}{27}$
- B.  $\frac{1}{9}$
- C.  $\frac{3}{9}$
- D. 1

12. Which of the following equations have a solution of  $y = 8$ ?

Select **all** that apply.

- A.  $4y + 3 = 32$
- B.  $6 + 5y = 46$
- C.  $9y \div 4 = 8$
- D.  $10y \div 4 = 20$
- E.  $65 - 3y = 27$

13. Jordan mows lawns to make money. He earns \$65 for every lawn,  $l$ , that he mows. Last week, he earned a total of \$390 mowing lawns.

Which equation represents Jordan's situation?

- A.  $390l = 65$
- B.  $390 \div l = 65$
- C.  $65 + l = 390$
- D.  $65 \div l = 390$

**Non-Calculator Section**

You may **not** use a calculator to solve the questions in this section.



14. Solve.

$$7.938 \div 4.41 = ?$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

15. Which expressions are equivalent to the expression below?

$$(m + 5) + (m + 5)$$

Select **all** that apply.

A.  $m + 10$

B.  $2m + 5$

C.  $2m + 10$

D.  $2(m + 5)$

E.  $5(m + 2)$

- 16.** Timothy is filling fish bowls with pebbles at his fish store. He wants to have  $\frac{1}{6}$  of a pound of pebbles in each fish bowl. There is a total of  $2\frac{1}{3}$  pounds of pebbles that Timothy can use.

What is the greatest number of fish bowls that Timothy can fill? Justify your answer.

Respond in the space provided.

17. Which expression is equivalent to the one below?

$$8 \times 8 \times 9 \times 9 \times 9 \times 9$$

- A.  $2^8 \times 4^9$
- B.  $8^2 + 9^4$
- C.  $8^2 \times 9^4$
- D.  $2(8) \times 4(9)$

18. Solve.

$$48,504 \div 16 = ?$$

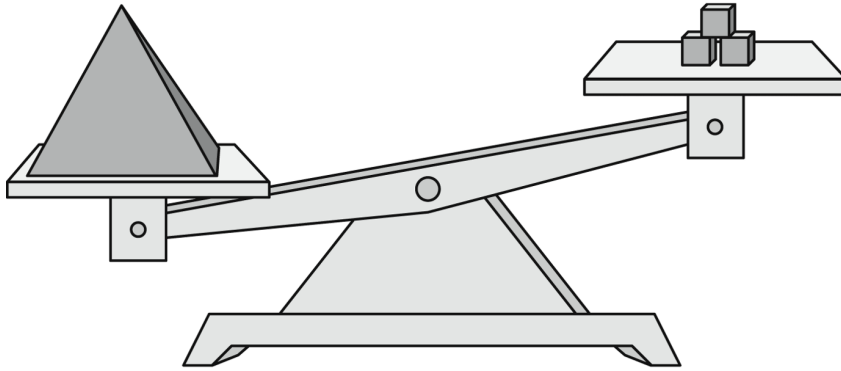
- A. 303.375
- B. 331.5
- C. 3,031.5
- D. 3,031.8

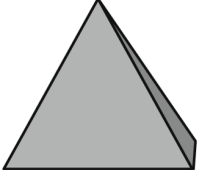
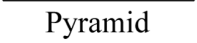


19. Which situation can be represented by the expression below?

$$12x + 10$$

- A. A person drives 12 miles each day for 10 days.
- B. A person runs  $x$  miles at a rate of 12 minutes per mile then walks for 10 minutes.
- C. A person drives 12 miles plus 10 miles for each additional hour they drive.
- D. A person runs 12 miles the first day,  $x$  miles the second day, and 10 miles the third day.

20. Use the picture below of the balance along with the key that describes the weight of each shape to answer the following question.



Key	
	= 6.58 ounces
 Pyramid	
 = 0.92 ounces Cube	
 = 0.764 ounces Cylinder	

How many cylinders would need to be added to the right side of the balance so that the right side is equal in weight to the left side? Show your work.

Respond in the space provided.



21. Which expression is equivalent to  $3(3x + 8)$ ?

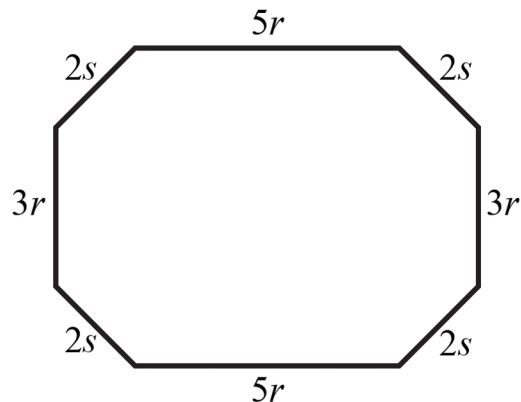
- A.  $33x$
- B.  $3x + 11$
- C.  $9x + 8$
- D.  $9x + 24$

22. Jameel has  $2\frac{2}{5}$  feet of string. Jameel needs  $\frac{1}{5}$  of a foot of string to sew a button onto a shirt.

What is the greatest number of buttons that Jameel can sew onto a shirt with the string he has?

- A.  $2\frac{1}{12}$
- B. 10
- C.  $10\frac{2}{5}$
- D. 12

23. Mr. Torrey draws and labels a figure, as shown below. He asks a group of students to each write an expression that is equivalent to the perimeter of the figure in terms of the given side lengths.



The students' expressions are shown below.

**Brian:**  $8(2r + s)$

**Marissa:**  $2(4r) + 2(4s)$

**Clara:**  $2(5r + 3r) + 4(2s)$

**Alex:**  $24 \times r \times s$

### Part A

Which expressions are equivalent to the perimeter of the figure? List **all** of the correct expressions. Show how you know the correct expressions are equivalent to each other.

Respond in the space provided.

**Part B**

Hanif says that  $2(4s) + 4(3r)$  is also equivalent to the perimeter of the figure.

Is Hanif correct? Justify your answer by substituting values for  $r$  and  $s$ .

Respond in the space provided.

24. Solve.

$$9.23 \times 2.5 = ?$$

- A. 6.461
- B. 22.965
- C. 23.075
- D. 230.75

25. Jackie bought 6 books for  $b$  dollars each and 3 magazines for  $m$  dollars each.

Which expression represents the total amount, in dollars, she spent on books and magazines?

- A.  $6b + 3m$
- B.  $6m + 3b$
- C.  $(6b)(3m)$
- D.  $6 + b + 3 + m$

26. Solve.

$$3,502 \div 17 = ?$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

27. Which expressions have a quotient of  $\frac{3}{4}$ ?

Select **all** that apply.

- A.  $\frac{2}{8} \div \frac{1}{3}$
- B.  $\frac{2}{3} \div 2$
- C.  $\frac{1}{2} \div \frac{3}{8}$
- D.  $1\frac{1}{4} \div 1\frac{2}{3}$
- E.  $4\frac{2}{3} \div 3\frac{1}{2}$

**28.** Evaluate the expression shown below.

$$7^2 - 2^3 \times (9 - 5)$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

**29.** Solve.

$$5.64 - 4.916 = ?$$

- A.** 0.724
- B.** 0.736
- C.** 1.336
- D.** 4.352

**30.** Ali writes the expression “half of the sum of 9 and a number.”

- Write an algebraic expression that is equivalent to Ali’s expression.
- Write a second algebraic expression that is different from, but equivalent to, your first expression.

Respond in the space provided.

- 31.** Patricia is filling a plastic pool with water using a bucket. The plastic pool holds  $4\frac{1}{2}$  gallons of water. Each bucket holds  $1\frac{1}{4}$  gallons of water.

How many buckets of water does Patricia use to fill the plastic pool completely?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

- 32.** Solve.

$$6.3 + 48.21 + 4 = ?$$

- A.** 48.88
- B.** 54.55
- C.** 58.24
- D.** 58.51

# Assessment Analysis Guide

## Interim Assessment 2

### Mathematics

### Grade 6



1

**Item Id: i112009****Item Type: Selected Response**

Standards Description:

6.EE.C.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Primary Standard: cc:6.EE.C.9

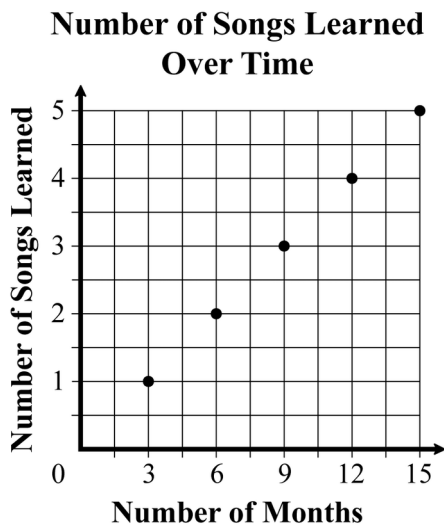
Points Possible: 1

Giorgio is learning to play the piano. He learns to play 3 new songs each month.

Which graph represents the total number of songs,  $y$ , he learns after  $x$  months?

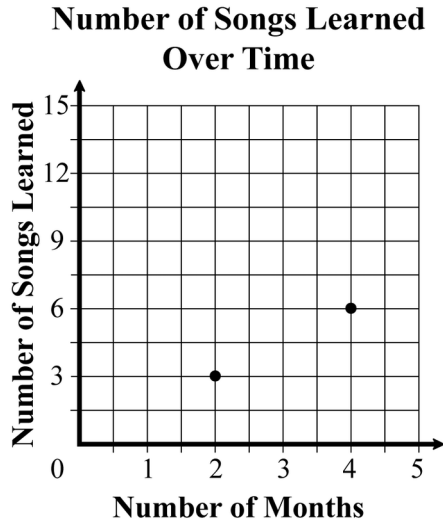
A.

Student chose a graph representing learning 1 song every 3 months; reversed the independent and dependent variables.



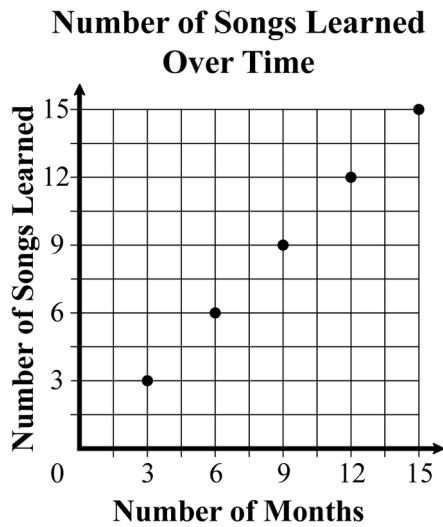
B.

Student chose a graph representing learning 3 songs every 2 months.



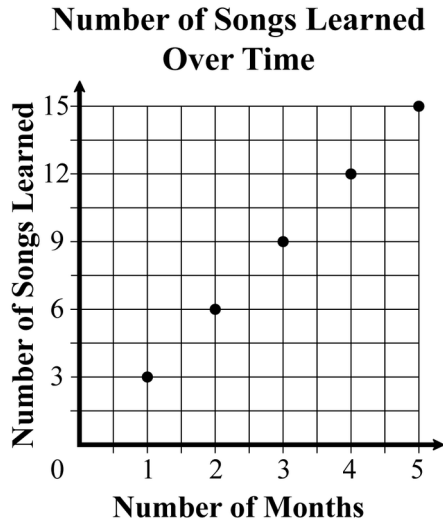
C.

Student chose a graph representing learning 3 songs every 3 months; chose a graph in which both axes increased by 3.



D.

Correct.



2

**Item Id: i139103****Item Type: Selected Response**

Standards Description:

6.EE.A.2.c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Primary Standard: cc:6.EE.A.2.c

Points Possible: 1

Evaluate the expression below when  $x = 2$  and  $z = 12$ .

$$z + 5x^3$$

- A. 25 Student evaluated  $x^3$  correctly but then added the 5 and 8, rather than multiplied, and added to 12.
- B. 42 Student evaluated the exponent incorrectly by multiplying 3 times 2.
- C. 52 Correct.
- D. 1,012 Student performed the order of operations incorrectly, multiplying  $5 \times 2$  first, cubing the answer, and then adding 12.

**Item Id: i131311****Item Type: Selected Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Primary Standard: cc:6.EE.B.7

Points Possible: 1

Tania is riding a train for 43.6 miles to get to her destination. The train has 14.3 more miles to travel before arriving at Tania's destination.

Which equation and solution correctly represent how many miles,  $m$ , the train has already traveled?

A. Correct.

$$m + 14.3 = 43.6$$

$$m = 29.3$$

B. Student switched the sum (43.6) with the distance left to travel (14.3) and attempted to solve for  $m$ ; may have subtracted 43.6 from 14.3 to solve for  $m$  and wrote the difference as positive, OR may have reversed the order of the minuend and subtrahend.

$$m + 43.6 = 14.3$$

$$m = 29.3$$

C. Student chose a correct equation, but used addition as the inverse operation instead of subtraction.

$$m + 14.3 = 43.6$$

$$m = 57.9$$

D.

Student switched the sum (43.6) with the distance already traveled ( $m$ ) and solved for  $m$ .

$$43.6 + 14.3 = m$$

$$m = 57.9$$

4

**Item Id: i112351****Item Type: Selected Response**

Standards Description:

6.EE.A.2.a Write expressions that record operations with numbers and with letters standing for numbers.

Primary Standard: cc:6.EE.A.2.a

Points Possible: 1

Which expression represents the phrase below?

*the product of 13 and the sum of a number,  $n$ , and 32*A.  $13 + 32n$ 

Student confused the definitions of "product" and "sum."

B.  $13n + 32$ Student wrote the terms and operations in the order they appear in the phrase; did not recognize that the term "sum" refers to  $n + 32$ .C.  $13(n + 32)$ 

Correct.

D.  $13 \div (n + 32)$ 

Student represented the term "product" with division.

5

**Item Id: i138367****Item Type: Selected Response**

Standards Description:

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Primary Standard: cc:6.EE.B.5

Points Possible: 1

Sienna is determining the solution to the equation  $6b + 12 = 102$ .

Which value is the solution to Sienna's equation?

- A. 15 Correct.
- B. 17 Student substituted 17 for b and multiplied but did not add 12.
- C. 90 Student chose the value that would be added to 12 to get 102.
- D. 102 Student chose the value representing the right side, or the isolated side, of the equation; did not recognize that the solution to an equation is any value that, when substituted for the variable, will make the equation true.



6

**Item Id: i139104****Item Type: Math Short Answer**

Standards Description:

6.EE.A.2.c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Primary Standard: cc:6.EE.A.2.c

Points Possible: 1

What is the value of the expression below when  $n = 2.4$ ?

$$4n \times 2 + 43$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.***Correct Answer:**

62.2

**Item Id: i131100****Item Type: Selected Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Primary Standard: cc:6.EE.B.7

Points Possible: 1

Solve for  $x$ .

$$\frac{4}{5} = 3x$$

A.  $\frac{4}{15}$

Correct.

B.  $\frac{5}{12}$

Student solved for  $x$  by multiplying the reciprocal of  $\frac{4}{5}$  by  $\frac{1}{3}$ .

C.  $2\frac{2}{5}$

Student solved for  $x$  by multiplying  $\frac{4}{5}$  by 3.

D.  $3\frac{3}{4}$

Student solved for  $x$  by multiplying the reciprocal of  $\frac{4}{5}$  by 3.

**Item Id: i138706****Item Type: Selected Response**

Standards Description:

6.EE.A.2.b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.

Primary Standard: cc:6.EE.A.2.b

Points Possible: 1

Which expression can be described as a product of two factors?

A.  $(1 \times 7) + 6$

Student chose an expression that represents the sum of two terms, OR student only accounted for the part of the expression in parentheses.

B.  $6 \div (4 \times 4)$

Student thought the word "product" refers to division and chose an expression that they believed represents a product of two factors, OR student only accounted for the part of the expression in parentheses.

C.  $10 - 6(7)$

Student chose an expression that represents the difference between two terms, OR student only accounted for the second part of the expression  $(6(7))$ .

D.  $12(4 + 5)$

Correct.

**Item Id: i111981****Item Type: Selected Response**

Standards Description:

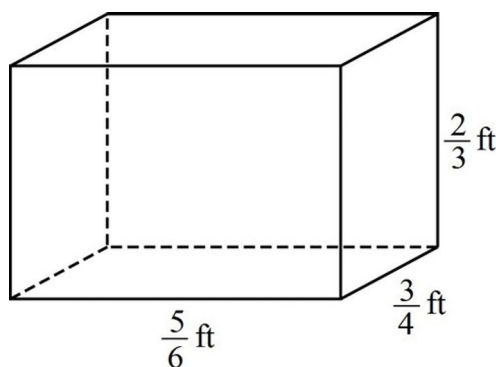
6.G.A.2

Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = lwh$  and  $V = bh$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.2

Points Possible: 1

What is the volume, in cubic feet, of the rectangular prism shown below?



(Figure not drawn to scale.)

A.  $\frac{5}{12}$

Correct.

B.  $\frac{5}{9}$

Student multiplied  $\frac{5}{6}$  by  $\frac{2}{3}$ ; possibly used the formula  $V = bh$ , but used  $\frac{5}{6}$  as the area of the base instead of the width.

C.  $\frac{5}{8}$

Student found the area of the base of the rectangular prism.

D.  $2\frac{1}{4}$

Student added the dimensions of length, width, and height instead of multiplying.

10

**Item Id: i111739****Item Type: Selected Response**

Standards Description:

6.EE.C.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Primary Standard: cc:6.EE.C.9

Points Possible: 1

Tionna folds paper cranes for party decorations. The number of hours she spends and the number of paper cranes folded are shown in the table below.

Number of Hours ( $h$ )	Number of Paper Cranes Folded ( $c$ )
1	15
2	30
3	45

Which equation represents the relationship between the number of hours,  $h$ , Tionna spends folding and the number of cranes,  $c$ , that she folds?

A.  $c = \frac{15}{h}$

Student divided the unit rate by the independent variable instead of multiplying, OR student chose an equation that represented the first set of values in the table, but not the other sets of values.

B.  $c = 15h$

Correct.

C.  $h = 15c$

Student switched the independent and dependent variables in the equation.

D.  $h = c + 15$

Student switched the independent and dependent variables and confused the idea of a coefficient and a constant, OR student attempted to model the relationship in the cranes column.

**Item Id: i139102****Item Type: Selected Response**

Standards Description:

6.EE.A.2.c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Primary Standard: cc:6.EE.A.2.c

Points Possible: 1

The formula for the volume of a cube is  $V = s^3$ , where  $s$  is the length of one side of the cube.

If  $s = \frac{1}{3}$  of a unit, what is the volume, in cubic units, of the cube?

- A.  $\frac{1}{27}$  Correct.
- B.  $\frac{1}{9}$  Student evaluated  $s^2$  instead of  $s^3$ , OR student multiplied the denominator (3) by 3.
- C.  $\frac{3}{9}$  Student evaluated  $s^3$  by multiplying the numerator (1) by 3 and the denominator (3) by 3.
- D. 1 Student evaluated  $s^3$  by multiplying (1/3) by 3.

**Item Id: i138368****Item Type: Multiple Select**

Standards Description:

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Primary Standard: cc:6.EE.B.5

Points Possible: 1

Which of the following equations have a solution of  $y = 8$ ?Select **all** that apply.

A.  $4y + 3 = 32$

Student thought that since  $4(8) = 32$ , the solution was  $y = 8$ ; did not consider how "+ 3" would change the solution.

B.  $6 + 5y = 46$

Correct.

C.  $9y \div 4 = 8$

Student misinterpreted a solution of  $y = 8$ ; thought that since the expression  $(9y/4)$  was equal to 8, the solution to the equation was 8.

D.  $10y \div 4 = 20$

Correct.

E.  $65 - 3y = 27$

Student did not substitute correctly; thought that  $3(8)$  was equal to 38 instead of 24.



**Item Id: i131102****Item Type: Selected Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Primary Standard: cc:6.EE.B.7

Points Possible: 1

Jordan mows lawns to make money. He earns \$65 for every lawn,  $l$ , that he mows. Last week, he earned a total of \$390 mowing lawns.

Which equation represents Jordan's situation?

A.  $390l = 65$

Student switched the coefficient with the product.

B.  $390 \div l = 65$

Correct.

C.  $65 + l = 390$

Student interpreted the coefficient (unit rate for mowing a lawn) as a constant and represented the total amount earned (390) as the sum.

D.  $65 \div l = 390$

Student switched the dividend with the quotient, OR identified the incorrect operation (division instead of multiplication).

14

**Item Id: i138705****Item Type: Math Short Answer**

Standards Description:

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Primary Standard: cc:6.NS.B.3

Points Possible: 1

Solve.

$$7.938 \div 4.41 = ?$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.***Correct Answer:**

1.8

15

**Item Id: i112889****Item Type: Multiple Select**

Standards Description:

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Primary Standard: cc:6.EE.A.4

Points Possible: 1

Which expressions are equivalent to the expression below?

$$(m + 5) + (m + 5)$$

Select **all** that apply.

A.  $m + 10$

Student combined the two constants, but did not combine the two coefficients; perhaps rewrote  $m$  instead of counting the coefficient of  $m$  as 1.

B.  $2m + 5$

Student combined both  $m$ 's to get  $2m$  but did not combine the 5s.

C.  $2m + 10$

Correct.

D.  $2(m + 5)$

Correct.

E.  $5(m + 2)$

Student switched the quantity of terms (2) with the constant (5).

**Item Id: i111762****Item Type: Constructed Response**

Standards Description:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Standard(s) for Mathematical Practice:

MP4 Model with mathematics.

To demonstrate their conceptual understanding of fraction division, students may model a given scenario using an equation. When comparing their equation and their answer, students should consider the reasonableness of the solution in the context of the problem.

Primary Standard: cc:6.NS.A.1

Points Possible: 2

Timothy is filling fish bowls with pebbles at his fish store. He wants to have  $\frac{1}{6}$  of a pound of pebbles in each fish bowl. There is a total of  $2\frac{1}{3}$  pounds of pebbles that Timothy can use.

What is the greatest number of fish bowls that Timothy can fill? Justify your answer.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$2\frac{1}{3} \div \frac{1}{6} = B$$

$$\frac{7}{3} \div \frac{1}{6} = B$$

$$\frac{7}{3} \times \frac{6}{1} = B$$

$$\frac{42}{3} = B$$

$$14 = B$$

The greatest number of fish bowls that Timothy can fill is 14 fish bowls.

**Evidence Statement(s):**

1. Student interpreted the context as division, and represented that  $2 \frac{1}{3}$  must be divided by  $\frac{1}{6}$  through an equation or visual model.
2. Student correctly determined the greatest number of fish bowls Timothy can fill by using their equation or visual model.

**Common Misconception(s):**

- Student misinterpreted the context as multiplication and multiplied  $2 \frac{1}{3}$  by  $\frac{1}{6}$ .
- Student did not correctly compute when dividing  $2 \frac{1}{3}$  by  $\frac{1}{6}$ ; may have not multiplied by the reciprocal of  $\frac{1}{6}$ .

**Item Id: i129613****Item Type: Selected Response**

Standards Description:

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.

Primary Standard: cc:6.EE.A.1

Points Possible: 1

Which expression is equivalent to the one below?

$$8 \times 8 \times 9 \times 9 \times 9 \times 9$$

A.  $2^8 \times 4^9$

Student confused the roles of the base and the exponent.

B.  $8^2 + 9^4$

Student understood the roles of the base and exponent, but added instead of multiplying.

C.  $8^2 \times 9^4$

Correct.

D.  $2(8) \times 4(9)$

Student multiplied the digits in the expression by the number of times they appeared and then multiplied the products.

18

**Item Id: i112452****Item Type: Selected Response**

Standards Description:

6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.

Primary Standard: cc:6.NS.B.2

Points Possible: 1

Solve.

$$48,504 \div 16 = ?$$

A. 303.375

Student skipped over the zero in the tens place and brought down the 4.

B. 331.5

Student did not put the placeholder zero in the hundreds place and continued to divide 50 by 16.

**C. 3,031.5**

Correct.

D. 3,031.8

Student used the remainder as the decimal.

**Item Id: i137888****Item Type: Selected Response**

Standards Description:

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Primary Standard: cc:6.EE.B.6

Points Possible: 1

Which situation can be represented by the expression below?

$$12x + 10$$

A. A person drives 12 miles each day for 10 days.

Student did not account for the variable, and multiplied the coefficient by the constant.

**B. A person runs  $x$  miles at a rate of 12 minutes per mile then walks for 10 minutes.** Correct.

C. A person drives 12 miles plus 10 miles for each additional hour they drive.

Student switched the coefficient of  $x$  and the constant.D. A person runs 12 miles the first day,  $x$  miles the second day, and 10 miles the third day.

Student chose a situation that represents addition of the three values; represented 12 as a constant rather than a coefficient in the given expression.



**Item Id: i112760****Item Type: Constructed Response**

Standards Description:

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Standard(s) for Mathematical Practice:

MP1 Make sense of problems and persevere in solving them.

Students must analyze and understand the problem in terms of mathematical operations. They may use expressions/equations to represent the steps of their determined solution pathway.

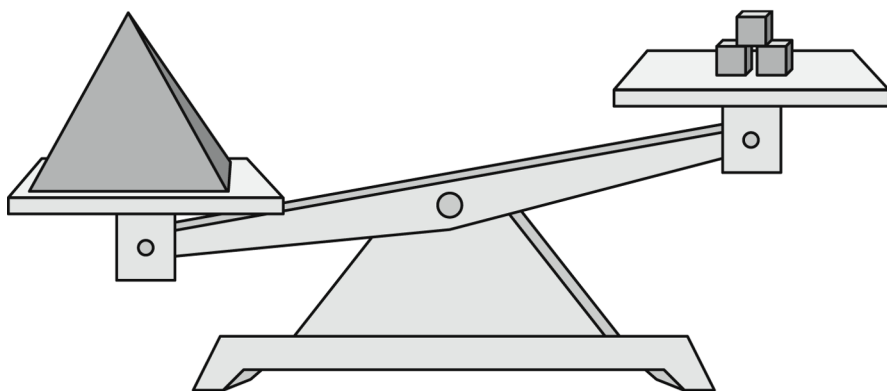
MP2 Reason abstractly and quantitatively.

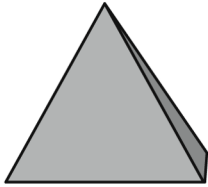


Students must think symbolically to understand how the given shapes relate to a quantity. They must decontextualize the corresponding numbers to calculate and then re-contextualize to present their answer in the correct units.

Primary Standard: cc:6.NS.B.3

Points Possible: 4

Use the picture below of the balance along with the key that describes the weight of each shape to answer the following question.



Key	
	= 6.58 ounces
Pyramid	
	= 0.92 ounces
Cube	
	= 0.764 ounces
Cylinder	

How many cylinders would need to be added to the right side of the balance so that the right side is equal in

weight to the left side? Show your work.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

Weight of initial right side:

$$0.92 \times 3 = 2.76 \text{ ounces}$$

Difference between left and right sides:

$$6.58 - 2.76 = 3.82 \text{ ounces}$$

Cylinders needed:

$$3.820 \div 0.764 = 5$$

5 cylinders are needed to balance the scale.

**Schools assessing online may wish to review student work on paper for evidence of mastery of the standard algorithm.**

**Evidence Statement(s):**

1. Student made sense of the problem by establishing and pursuing a solution pathway in which decimal fluency could be applied.
2. Student determined the initial value of the right side of the balance by fluently multiplying or adding.
3. Student fluently subtracted to determine the initial difference in the values of the right side and the left side of the balance.
4. Student fluently divided to determine the number of cylinders that would need to be added to the right side of the balance so that the right side is equal in weight to the left side.

**Common Misconception(s):**

- Student may not have accounted for the 3 cubes initially on the right side of the balance and used 0.92 oz as the initial weight of the right side instead of  $3(0.92 \text{ oz})$  or  $0.92 + 0.92 + 0.92$ .
- Student may have divided the weight of the left side of the balance by the weight of 1 cylinder and concluded that this quotient is the number of cylinders to add to the right side of the balance, not accounting for the 3 cubes on the right side initially.

**Item Id: i112483****Item Type: Selected Response**

Standards Description:

6.EE.A.3 Apply the properties of operations to generate equivalent expressions.

Primary Standard: cc:6.EE.A.3

Points Possible: 1

Which expression is equivalent to  $3(3x + 8)$ ?A.  $33x$ Student incorrectly combined the unlike terms  $3x$  and  $8$  to get  $11x$ , and then multiplied  $3$  by  $11x$ .B.  $3x + 11$ 

Student added the number outside the parentheses to the constant inside the parentheses.

C.  $9x + 8$ Student applied the distributive property incorrectly by multiplying  $3$  by only the first term inside the parentheses.D.  $9x + 24$ 

Correct.

**Item Id: i139137****Item Type: Selected Response**

Standards Description:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Primary Standard: cc:6.NS.A.1

Points Possible: 1

Jameel has  $2\frac{2}{5}$  feet of string. Jameel needs  $\frac{1}{5}$  of a foot of string to sew a button onto a shirt.

What is the greatest number of buttons that Jameel can sew onto a shirt with the string he has?

A.  $2\frac{1}{12}$ 

Student converted  $2\frac{2}{5}$  into  $\frac{12}{5}$  and multiplied the reciprocal of both the dividend ( $\frac{12}{5}$ ) and the divisor ( $\frac{1}{5}$ ) when dividing.

B. 10

Student did not account for the extra  $\frac{2}{5}$  foot (calculated the number of  $\frac{1}{5}$  ft in 2 ft), OR student did not understand how to divide with a mixed number.

C.  $10\frac{2}{5}$ 

Student divided 2 by  $\frac{1}{5}$  to get 10 and divided  $\frac{2}{5}$  by  $\frac{1}{5}$  but thought that  $\frac{2}{5}$  divided by  $\frac{1}{5}$  equals  $\frac{2}{5}$  just as 2 divided by 1 equals 2.

D. 12

Correct.

23

**Item Id: i130831****Item Type: Constructed Response**

Standards Description:

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Standard(s) for Mathematical Practice:

MP2 Reason abstractly and quantitatively.

Students must find an entry point to this problem by first generating their own expression to describe the perimeter of the figure.

MP3 Construct viable arguments and critique the reasoning of others.

In Part B, students must justify their conclusion regarding whether or not they agree with Hanif's statement.

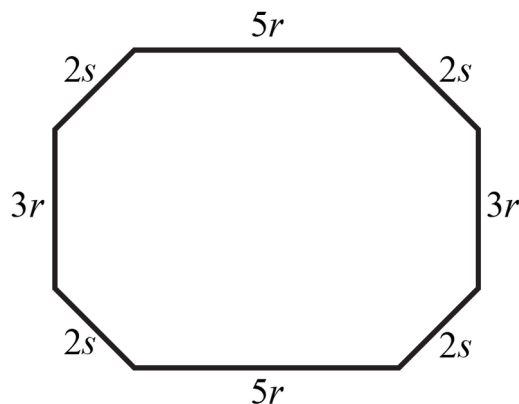
23A

Primary Standard: cc:6.EE.A.4

Secondary Standard(s): cc:6.EE.A.3

Points Possible: 3

Mr. Torrey draws and labels a figure, as shown below. He asks a group of students to each write an expression that is equivalent to the perimeter of the figure in terms of the given side lengths.



The students' expressions are shown below.

**Brian:**  $8(2r + s)$

**Marissa:**  $2(4r) + 2(4s)$

**Clara:**  $2(5r + 3r) + 4(2s)$

**Alex:**  $24 \times r \times s$

### Part A

Which expressions are equivalent to the perimeter of the figure? List **all** of the correct expressions. Show how you know the correct expressions are equivalent to each other.

Respond in the space provided.

#### Exemplar Student Response:

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

Perimeter of figure:

$$2(5r) + 4(2s) + 2(3r)$$

$$16r + 8s$$

Brian's Expression:

$$8(2r + s)$$

$$16r + 8s$$

Clara's Expression:

$$2(5r + 3r) + 4(2s)$$

$$16r + 8s$$

Brian's expression  $8(2r + s)$  and Clara's expression  $2(5r + 3r) + 4(2s)$  are equivalent to the perimeter of the figure, which is  $16r + 8s$ .

#### Evidence Statement(s):

1. Student applied the properties of operations to determine how the perimeter of the figure could be represented as an expression.
2. Student determined that Brian's expression is equivalent to the perimeter of the figure by applying the properties of operations or by using substitution.
3. Student determined that Clara's expression is equivalent to the perimeter of the figure by applying the properties of operations or by using substitution.

#### Common Misconception(s):

- Student may have combined unlike terms by adding all of the coefficients and combining the variables to identify Alex's expression.
- Student did not recognize that only one term of Marissa's expression ( $8s$ ) was equivalent to the perimeter of the figure; identified Marissa's expression as equivalent to the perimeter.

23B

Primary Standard: cc:6.EE.A.4

Secondary Standard(s): cc:6.EE.A.3

Points Possible: 1

**Part B**Hanif says that  $2(4s) + 4(3r)$  is also equivalent to the perimeter of the figure.Is Hanif correct? Justify your answer by substituting values for  $r$  and  $s$ .

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

If  $r = 2$  and  $s = 2$ :

Perimeter:

$$16r + 8s$$

$$16(2) + 8(2)$$

$$48$$

Hanif's Expression:

$$2(4s) + 4(3r)$$

$$2(4 \times 2) + 4(3 \times 2)$$

$$2(8) + 4(6)$$

$$16 + 24$$

$$40$$

Hanif is incorrect when he says that  $2(4s) + 4(3r)$  is also equivalent to the perimeter of the figure because his expression does not name the same number as  $16r + 8s$  for all values of  $r$  and  $s$ .



**Evidence Statement(s):**

1. Student identified that Hanif's expression is not equivalent to one that represents the perimeter of the figure.
2. Student used substitution to justify their answer; demonstrated understanding that Hanif's expression is not equivalent to the perimeter because it does not name the same number as the perimeter when the same values are substituted for  $r$  and  $s$ .

**Common Misconception(s):**

- Student may have evaluated a correct expression with different values for  $r$  and  $s$  than used for Hanif's expression.
- Student may have come to the correct conclusion but with incorrect reasoning.

**Item Id: i138696****Item Type: Selected Response**

Standards Description:

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Primary Standard: cc:6.NS.B.3

Points Possible: 1

Solve.

$$9.23 \times 2.5 = ?$$

A. 6.461

Student did not use a placeholder when multiplying by the 2 of 2.5 and did not recognize that the product should be greater than 9.23 because 9.23 is being multiplied by a number greater than 1.

B. 22.965

Student did not regroup when multiplying  $5 \times 3$  and  $5 \times 2$  in the first and second steps.

**C. 23.075**

Correct.

D. 230.75

Student did not correctly place the decimal; placed the decimal point two decimal places to the left of the last digit to match the placement of the decimal point in 9.23.

25

**Item Id: i130558****Item Type: Selected Response**

Standards Description:

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Primary Standard: cc:6.EE.B.6

Points Possible: 1

Jackie bought 6 books for  $b$  dollars each and 3 magazines for  $m$  dollars each.

Which expression represents the total amount, in dollars, she spent on books and magazines?

A.  $6b + 3m$ 

Correct.

B.  $6m + 3b$ 

Student chose an expression in which the variables are interchanged.

C.  $(6b)(3m)$ 

Student chose an expression in which the costs are multiplied instead of added.

D.  $6 + b + 3 + m$ 

Student chose an expression in which all values and variables are added together; perhaps read the word "total" to mean addition only.

26
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**Item Id: i113020****Item Type: Math Short Answer**

Standards Description:

6.NS.B.2      Fluently divide multi-digit numbers using the standard algorithm.

Primary Standard: cc:6.NS.B.2

Points Possible: 1

Solve.

$$3,502 \div 17 = ?$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.***Correct Answer:**

206

**Item Id: i139107****Item Type: Multiple Select**

Standards Description:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Primary Standard: cc:6.NS.A.1

Points Possible: 1

Which expressions have a quotient of  $\frac{3}{4}$ ?Select **all** that apply.

A.  $\frac{2}{8} \div \frac{1}{3}$

Correct.

B.  $\frac{2}{3} \div 2$

Student took the reciprocal of both the dividend ( $\frac{2}{3}$ ) and the divisor (2) before multiplying, instead of only taking the reciprocal of the divisor.

C.  $\frac{1}{2} \div \frac{3}{8}$

Student took the reciprocal of the dividend ( $\frac{1}{2}$ ) instead of the divisor ( $\frac{3}{8}$ ) and then multiplied.

D.  $1\frac{1}{4} \div 1\frac{2}{3}$

Correct.

E.  $4\frac{2}{3} \div 3\frac{1}{2}$

Student converted  $4\frac{2}{3}$  into  $\frac{14}{3}$  and  $3\frac{1}{2}$  into  $\frac{7}{2}$  but took the reciprocal of the dividend ( $\frac{14}{3}$ ) instead of the divisor ( $\frac{7}{2}$ ) and then multiplied.

28

**Item Id: i129610****Item Type: Math Short Answer**

Standards Description:

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.

Primary Standard: cc:6.EE.A.1

Points Possible: 1

Evaluate the expression shown below.

$$7^2 - 2^3 \times (9 - 5)$$

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.***Correct Answer:**

17

**Item Id: i138698****Item Type: Selected Response**

Standards Description:

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Primary Standard: cc:6.NS.B.3

Points Possible: 1

Solve.

$$5.64 - 4.916 = ?$$

A. 0.724

Correct.

B. 0.736

Student wrote the 6 in the thousandths place instead of subtracting, OR student did not regroup from the hundredths place, subtracting zero from 6 in the thousandths place.

C. 1.336

Student did not regroup from the hundredths place, subtracting zero from 6 in the thousandths place, and did not regroup from the ones place, subtracting 6 from 9 in the tenths place.

D. 4.352

Student subtracted 5.64 from 4.916, and right-aligned the digits.

**Item Id: i138383****Item Type: Constructed Response**

Standards Description:

6.EE.A.3 Apply the properties of operations to generate equivalent expressions.

Standard(s) for Mathematical Practice:

MP7 Look for and make use of structure.

In this problem, students make sense of the quantities in the verbal expression as they represent it as two different, equivalent expressions.

Primary Standard: cc:6.EE.A.3

Secondary Standard(s): cc:6.EE.A.2.a

Points Possible: 2

Ali writes the expression “half of the sum of 9 and a number.”

- Write an algebraic expression that is equivalent to Ali’s expression.
- Write a second algebraic expression that is different from, but equivalent to, your first expression.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$\frac{9 + n}{2}$$

$$\frac{1}{2}(9 + n)$$

**Evidence Statement(s):**

1. Student wrote an algebraic expression equivalent to Ali’s verbal expression.
2. Student wrote a second expression, equivalent to their first expression, by applying properties of operations.

**Common Misconception(s):**



- Student did not know how to represent "half of" as dividing by 2 or multiplying by  $\frac{1}{2}$ ; may have added  $\frac{1}{2}$  to  $9 + n$ .
- Student misapplied properties of operations when writing their second expression; for example, wrote  $\frac{9}{2} + n$ .

**Item Id: i139138****Item Type: Math Short Answer**

Standards Description:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Primary Standard: cc:6.NS.A.1

Points Possible: 1

Patricia is filling a plastic pool with water using a bucket. The plastic pool holds  $4\frac{1}{2}$  gallons of water. Each bucket holds  $1\frac{1}{4}$  gallons of water.

How many buckets of water does Patricia use to fill the plastic pool completely?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

**Correct Answer:** $3\frac{3}{5}$  buckets**Equivalent answers are also accepted.**

**Item Id: i138697****Item Type: Selected Response**

Standards Description:

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Primary Standard: cc:6.NS.B.3

Points Possible: 1

Solve.

$$6.3 + 48.21 + 4 = ?$$

A. 48.88

Student lined up all the digits to the right, added, and placed the decimal point two decimal places to the left of the last digit to match the placement of the decimal point in 48.21.

B. 54.55

Student added 48.21 and 6.3 correctly but lined the 4 up in the hundredths place.

C. 58.24

Student inserted a zero into the tenths place of 6.3 and added 6.03 to 48.21, then added 4.

**D. 58.51****Correct.**

# Interim Assessment 3

## Mathematics

### Grade 6

student: \_\_\_\_\_

teacher: \_\_\_\_\_

school: \_\_\_\_\_



**DIRECTIONS**

In this assessment you will answer a total of 36 questions, including 4 constructed-response question(s). Mark all of your answers to the questions on the answer sheet provided.

You may use this test booklet to work out the questions, but remember to mark all of your answers on the answer sheet. For constructed-response questions, record your answers directly on the page in the test booklet.

***Calculator Section***

*You may use a calculator to solve the questions in this section.*



1. What is the value of the expression below when  $t = 4.6$ ?

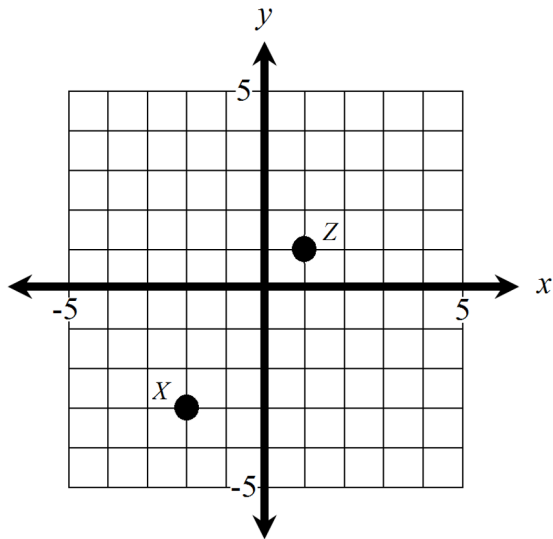
$$39 - 2t \times 3$$

- A. 11.4
- B. 19.2
- C. 43.2
- D. 89.4

2. Mateo wants to draw a right triangle and label it  $XYZ$ . Mateo has already plotted points  $X$  and  $Z$ .

The location of point  $Y$  is:

- 3 units away from  $X$
- 4 units away from  $Z$



Which coordinate pair represents the location of point  $Y$ ?

- A.  $(-2, 4)$
- B.  $(-2, 1)$
- C.  $(1, -3)$
- D.  $(3, 4)$

3. Solve for  $x$ .

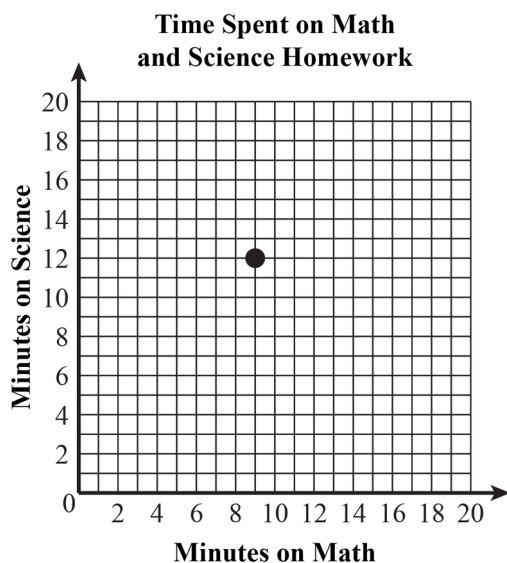
$$0.8x = 3.4$$

- A. 2.6
- B. 2.72
- C. 4.2
- D. 4.25

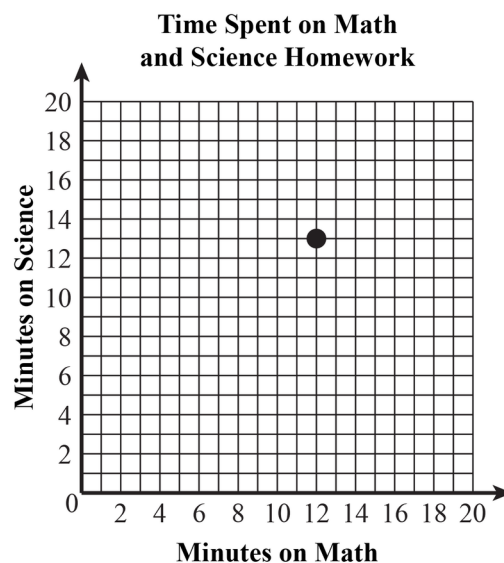
4. Last night, Tyrus spent 3 minutes on math homework for every 4 minutes he spent on science homework.

If he spent 12 minutes doing math homework, which coordinate plane below shows the point graphed that represents the total amount of time he spent doing math and science homework last night?

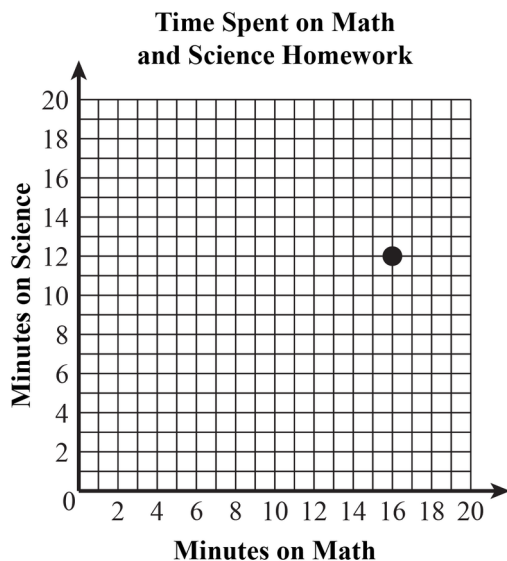
A.



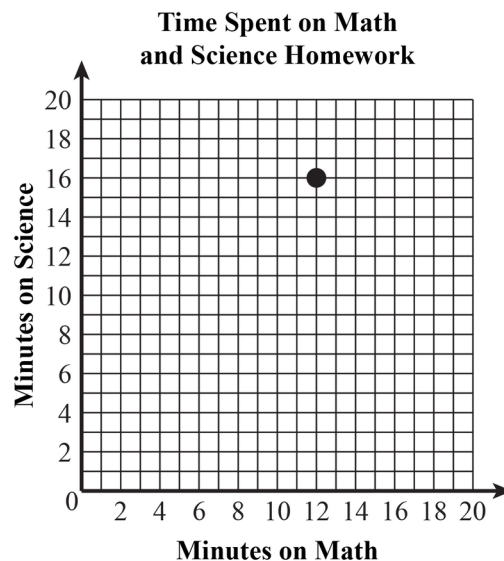
C.



B.



D.





5. At a carnival in a small town, the entry fee was \$8 per person, and the cost for each ride ticket was \$2.

The inequality below was used to determine if the town met its goal of earning more than \$1,650 each day the carnival was open.

$$8p + 2r > 1,650$$

The following variables were used:

$p$  = the number of people who attended the carnival

$r$  = the number of ride tickets sold

- On Friday, 150 people attended the carnival. A total of 275 ride tickets were sold.
- On Saturday, 110 people attended the carnival. A total of 340 ride tickets were sold.
- On Sunday, 130 people attended the carnival. A total of 305 ride tickets were sold.

For each day the carnival was open, state whether or not the town met its goal. Show all the steps you took to find your answers using the provided inequality.

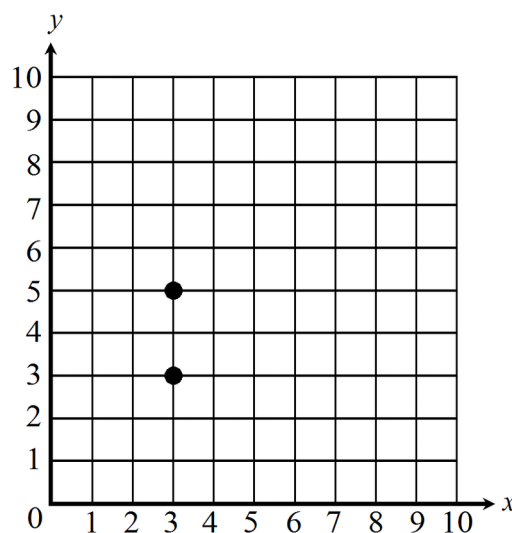
Respond in the space provided.

6. Karim began his day by drinking  $1\frac{1}{8}$  cups of milk at breakfast. By the end of the day, he drank a total of  $2\frac{2}{3}$  cups of milk.

Which equation and solution correctly represent the amount of milk in cups,  $m$ , Karim drank after breakfast?

- A.  $1\frac{1}{8} + m = 2\frac{2}{3}$   
 $m = 1\frac{13}{24}$
- B.  $1\frac{1}{8} + m = 2\frac{2}{3}$   
 $m = 3\frac{19}{24}$
- C.  $m - 1\frac{1}{8} = 2\frac{2}{3}$   
 $m = 3\frac{19}{24}$
- D.  $m - 1\frac{1}{8} = 2\frac{2}{3}$   
 $m = 1\frac{13}{24}$

7. The coordinate grid below shows two points.



Which points would create a square with the points on the coordinate grid?

- A. (4, 5) and (4, 3)
- B. (5, 4) and (5, 6)
- C. (5, 5) and (5, 3)
- D. (5, 5) and (3, 5)

8. Marianne tracks her progress on her reading assignments in the table below.

	Number of Total Pages Assigned	Number of Pages Read	Percent Read
Week 1	70		90%
Week 2	75	30	
Week 3		40	80%

**Part A**

Determine all missing values for the table above. Show your work.

Respond in the space provided.

**Part B**

Marianne's teacher also assigns essays and quizzes.

- There are 2 essays for every 60 days of school.
- There are 4 quizzes for every 40 days of school.

In 120 days of school, how many essays and how many quizzes will Marianne's teacher give the class? Show or explain all the steps you used to solve this problem.

Respond in the space provided.

9. Which of the following can be substituted for  $y$  to make the inequality below true?

$$24 > 6 + 3y$$

Select **all** that apply.

- A. 2.75
- B. 5
- C. 6
- D. All whole numbers
- E. All numbers less than 6
- F. All numbers greater than 6

10. Which phrases are equivalent to  $y - 6$ ?

Select **all** that apply.

- A. a number minus 6
- B. 6 less than a number
- C. 6 decreased by a number
- D. a number taken away from 6
- E. the quotient of a number and 6

- 11.** Madjeen jogs around the pond by her house twice a day. In the morning, she jogs 3.5 laps around the pond. In the evening, she jogs 1 lap around the pond. Madjeen jogs a total of 5.4 miles.

Write and solve an equation to find out how many miles are in each lap around the pond.

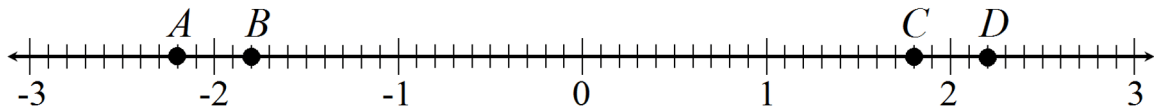
Respond in the space provided.

**Non-Calculator Section**

You may **not** use a calculator to solve the questions in this section.



12. Points  $A$ ,  $B$ ,  $C$ , and  $D$  are shown on the number line below.



Which point represents the position of  $-2.2$  on the number line?

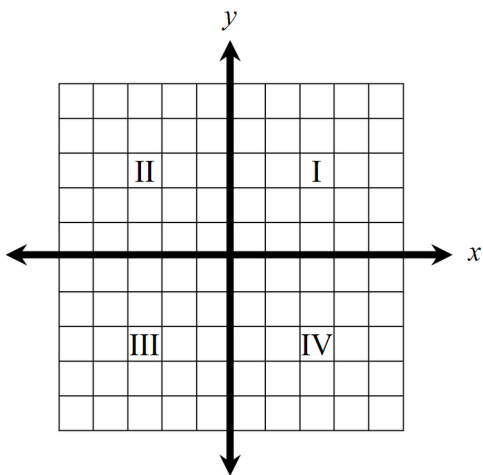
- A.  $A$
- B.  $B$
- C.  $C$
- D.  $D$

13. Clara makes and sells paintings. The supplies needed to make each painting cost her \$13.00. She earns \$75.00 for each painting she sells.

Which set of integers **best** represents these values?

- A.  $-13$  and  $-75$
- B.  $-13$  and  $75$
- C.  $13$  and  $-75$
- D.  $13$  and  $75$

14. The variables  $a$  and  $b$  are positive numbers.



In which quadrant is  $(-a, -b)$  found?

- A. I
- B. II
- C. III
- D. IV

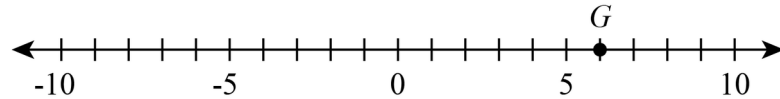
15. At a store, 2 notebooks cost \$6. Each notebook costs the same amount of money.

Which statements are true?

Select **all** that apply.

- A. The store charges \$3 per notebook.
- B. The store charges \$4 per notebook.
- C. The store charges \$15 for 5 notebooks.
- D. The store charges \$13 for 9 notebooks.
- E. The store charges \$4 for 12 notebooks.

16. Use the number line below to answer the question.



Which statement about the location of point  $G$  on the number line is true?

- A. The location of point  $G$  can be described as  $-6$ .
- B. The location of point  $G$  can be described as the opposite of 6.
- C. The location of point  $G$  can be described as the opposite of  $-6$ .
- D. The location of point  $G$  can be described as the opposite of the opposite of  $-6$ .



17. Jackson has  $h$  hats. Davonte has half as many hats as Jackson. Princeton has 5 hats.

Which expression can be used to find the number of hats they have in total?

- A.  $h + \frac{1}{2} + 5$
- B.  $h + \frac{h}{2} + 5$
- C.  $h + 2h + 5$
- D.  $h + \frac{1}{2}h - 5$

18. Which situations can be represented by the integer  $-5$ ?

Select **all** that apply.

- A. Jarvis spent \$5.
- B. Abdul lost 5 points.
- C. The bird rose 5 meters.
- D. A plant grew 5 centimeters.
- E. The temperature decreased 5 degrees.

- 19.** On Monday, the coldest temperature outside was 2 degrees Fahrenheit. On Tuesday, Ms. Perkins tells her students that the coldest temperature outside has an absolute value of 4 degrees.
- Rachel says that Tuesday's coldest temperature could be greater than Monday's coldest temperature.
  - Tom says that Tuesday's coldest temperature could be less than Monday's coldest temperature.

State whether each student's statement is true or false, and justify your answers.

Respond in the space provided.

20. If Expression A is equivalent to Expression B, which number belongs in the blank of Expression B below?

Expression A:  $2y + y + 3y + y$

Expression B:  $\_\_y$

- A. 4
- B. 5
- C. 6
- D. 7
21. Sheldon is creating a graph to represent the trip he takes from his home to his favorite clothing store. In his graph, one unit on the coordinate plane is equal to one mile. He draws a point at  $(4, 3)$  to represent the location of his house. The store is 5 miles away from his house.

Which coordinate pairs could represent the location of Sheldon's favorite clothing store?

Select **all** that apply.

- A.  $(-1, 3)$
- B.  $(4, -2)$
- C.  $(4, 5)$
- D.  $(4, 8)$
- E.  $(5, 3)$

22. A batch of muffins requires  $\frac{3}{4}$  of a cup of flour.
- How many batches of muffins can be made from  $5\frac{1}{3}$  cups of flour?

- A.  $\frac{9}{64}$
- B. 4
- C.  $5\frac{4}{9}$
- D.  $7\frac{1}{9}$
23. A teacher wrote the inequality below to represent the number of students,  $s$ , that are in each classroom.

$$s > 26$$

Which situation is correctly represented by the inequality?

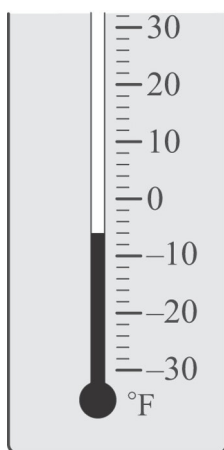
- A. There are at least 26 students in each classroom.
- B. There are at most 26 students in each classroom.
- C. There are less than 26 students in each classroom.
- D. There are more than 26 students in each classroom.

24. A person dove more than 100 feet below sea level.

Which value could represent the elevation, in feet, that the person dove?

- A.  $-125$
- B.  $-50$
- C.  $60$
- D.  $150$

25. Use the thermometer below to answer the question.



What is the temperature, in degrees Fahrenheit, shown on the thermometer above to the nearest integer?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.*

26. Which value is equivalent to the expression below?

$$\left(\frac{2}{3}\right)^3$$

- A.  $\frac{6}{3}$
- B.  $\frac{6}{9}$
- C.  $\frac{8}{3}$
- D.  $\frac{8}{27}$

27. A change in the water level of a swimming pool is recorded as  $-12$  inches.

Which of the following statements **must** be true?

Select **all** that apply.

- A. The water level increased by 12 inches.
- B. The water level increased by  $|-12|$  inches.
- C. The water level decreased by  $|-12|$  inches.
- D. The water level has a height of  $-12$  inches.
- E. The water level experienced a change of 12 inches.

28. The points  $(-3, 8)$  and  $(4, 8)$  are plotted on a coordinate plane.

Which expression represents the distance between the two points?

- A.  $|-3| + |4|$   
B.  $|-3| + |8|$   
C.  $|4| - |-3|$   
D.  $|8| - |-3|$
29. Two points are graphed on a coordinate grid. Point  $A$  is located at  $(-8, -3)$ . Point  $B$  is created by reflecting point  $A$  over an axis.

Which coordinates could be the coordinates of point  $B$ ?

Select **all** that apply.

- A.  $(-8, 3)$   
B.  $(-3, -8)$   
C.  $(3, -8)$   
D.  $(8, 3)$   
E.  $(8, -3)$

30. Which two expressions are equivalent?

1.  $b + b + b + b$   
2.  $b^4$   
3.  $b + 4$   
4.  $4b$

- A. 1 and 2  
B. 1 and 4  
C. 2 and 3  
D. 3 and 4

31. Which comparison **and** explanation are correct?

- A.  $-16 < 4$  because 4 is farther away from zero.  
B.  $-16 < 4$  because 4 is to the right of  $-16$  on a number line.  
C.  $-16 > 4$  because  $-16$  is farther away from zero.  
D.  $-16 > 4$  because  $-16$  is to the left of 4 on a number line.

32. Three bike riders began a bike ride from their school. All three bike riders rode either north, south, or a combination of north and south.

The table below shows each bike rider's position relative to their school after an hour. A positive number represents a position, in miles, to the north of their school. A negative number represents a position, in miles, to the south of their school.

<b>Bike Rider</b>	<b>Position Relative to Their School after an Hour</b>
Bike Rider 1	0
Bike Rider 2	-5.3
Bike Rider 3	2.8

Which statements **must** be true?

Select **all** that apply.

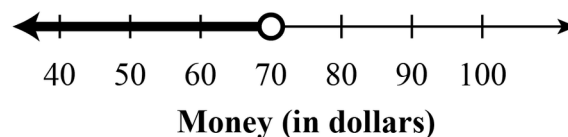
- A. Bike Rider 1 rode the least amount of miles.
- B. Bike Rider 1 was back to their school after an hour.
- C. Bike Rider 2 was farthest away from their school after an hour.
- D. Bike Rider 3 was farthest away from their school after an hour.
- E. Bike Rider 2 and Bike Rider 3 were not back to their school after an hour.

33. Which statements about temperature are true?

Select **all** that apply.

- A.  $0^{\circ}\text{F}$  is warmer than  $-3^{\circ}\text{F}$  because  $0 > -3$ .
- B.  $-12^{\circ}\text{F}$  is colder than  $-5^{\circ}\text{F}$  because  $-12 < -5$ .
- C.  $-22^{\circ}\text{F}$  is warmer than  $16^{\circ}\text{F}$  because  $-22 > 16$ .
- D.  $-4.2^{\circ}\text{F}$  is colder than  $-4.1^{\circ}\text{F}$  because  $-4.2 < -4.1$ .
- E.  $-1.5^{\circ}\text{F}$  is warmer than  $-1.4^{\circ}\text{F}$  because  $-1.5 > -1.4$ .

34. The number line below represents how much money, in dollars, each person commits to spending in one week.



Which statement best describes the amount of money that each person commits to spending?

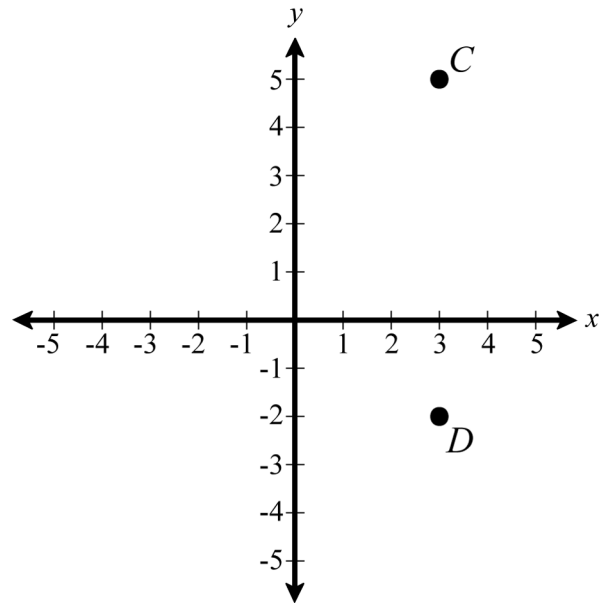
- A. Each person commits to spending exactly \$70.
- B. Each person commits to spending at least \$70.
- C. Each person commits to spending less than \$70.
- D. Each person commits to spending between \$40 and \$70.

35. Which of the following are true?

Select **all** that apply.

- A.  $-(-9) = 9$
- B.  $-(-5) = -5$
- C.  $-(10) = -10$
- D. The opposite of 8 will be 8 units to the left of 0 on a number line.
- E. The opposite of every number will be to the left of 0 on a number line.

36. What is the distance, in units, between points  $C$  and  $D$  on the graph below?



- A. 3
- B. 5
- C. 7
- D. 8



Assessment Analysis Guide  
Interim Assessment 3  
**Mathematics**  
**Grade 6**

1

**Item Id: i112278****Item Type: Selected Response**

Standards Description:

6.EE.A.2.c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Primary Standard: cc:6.EE.A.2.c

Points Possible: 1

What is the value of the expression below when  $t = 4.6$ ?

$$39 - 2t \times 3$$

A. 11.4

Correct.

B. 19.2

Student may have added 2 and 4.6 to get 6.6 instead of multiplying 2 and 4.6 to get 9.2.

C. 43.2

Student may have combined 2 and 4.6 to get 24.6 instead of multiplying 2 and 4.6 to get 9.2, and then evaluated each remaining operation in the expression from left to right.

D. 89.4

Student may have correctly substituted 4.6 and multiplied to get  $39 - 9.2 \times 3$ , but then evaluated each remaining operation in the expression from left to right.

2

**Item Id: i112108****Item Type: Selected Response**

Standards Description:

6.G.A.3

Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

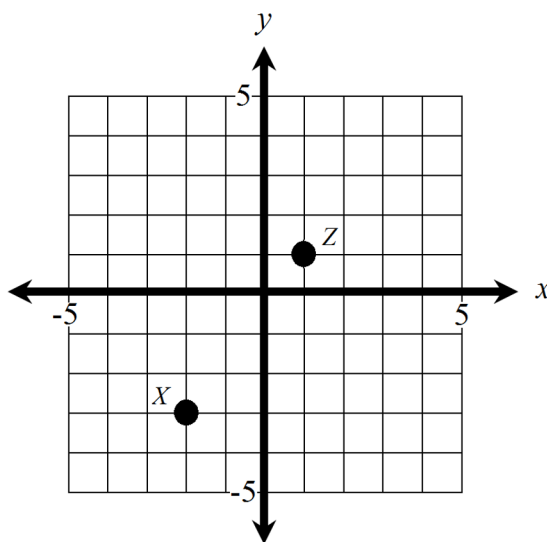
Primary Standard: cc:6.G.A.3

Points Possible: 1

Mateo wants to draw a right triangle and label it  $XYZ$ . Mateo has already plotted points  $X$  and  $Z$ .

The location of point  $Y$  is:

- 3 units away from  $X$
- 4 units away from  $Z$



Which coordinate pair represents the location of point  $Y$ ?

A.  $(-2, 4)$ 

Student added 3 units and 4 units to get 7 units and counted 7 units up from  $X$ ; did not recognize that plotting a point at  $(-2, 4)$  would not create a right triangle.

B.  $(-2, 1)$

Student chose a coordinate pair that forms a right triangle with points X and Z but counted 4 units from X, instead of 3, and counted 3 units from Z, instead of 4.

C.  $(1, -3)$

Correct.

D.  $(3, 4)$

Student chose the coordinate pair that has a 3 and 4 because Y is 3 units away from X and 4 units away from Z; did not recognize that plotting a point at  $(3, 4)$  would not create a right triangle.

3

**Item Id: i112246****Item Type: Selected Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Primary Standard: cc:6.EE.B.7

Points Possible: 1

Solve for  $x$ .

$$0.8x = 3.4$$

- A. 2.6 Student subtracted 0.8 from 3.4 instead of dividing; possibly thought subtraction was the inverse operation of multiplication.
- B. 2.72 Student multiplied 3.4 by 0.8 instead of dividing 3.4 by 0.8; did not use the inverse operation to solve.
- C. 4.2 Student added 0.8 to 3.4 instead of dividing; possibly thought addition was the inverse operation of multiplication, OR student did not complete the division.
- D. 4.25** Correct.

**Item Id: i129121**

**Item Type: Selected Response**

Standards Description:

6.RP.A.3.a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

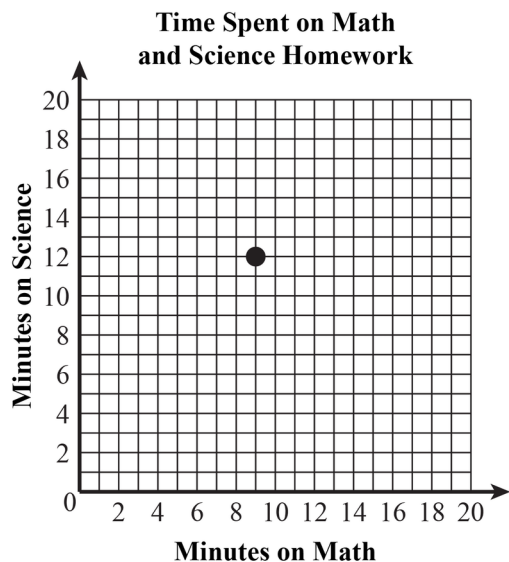
Primary Standard: cc:6.RP.A.3.a

Points Possible: 1

Last night, Tyrus spent 3 minutes on math homework for every 4 minutes he spent on science homework.

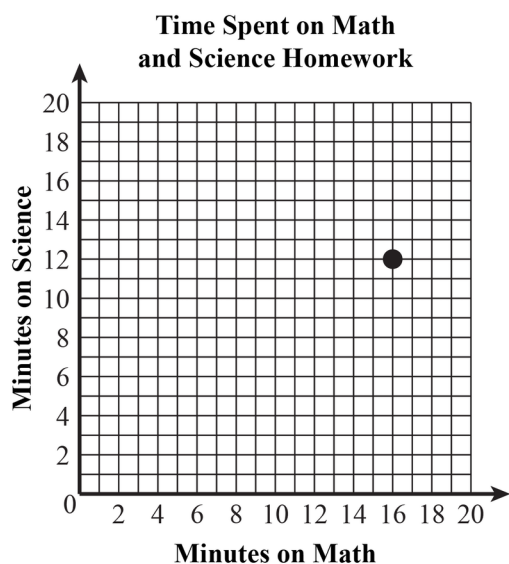
If he spent 12 minutes doing math homework, which coordinate plane below shows the point graphed that represents the total amount of time he spent doing math and science homework last night?

A.



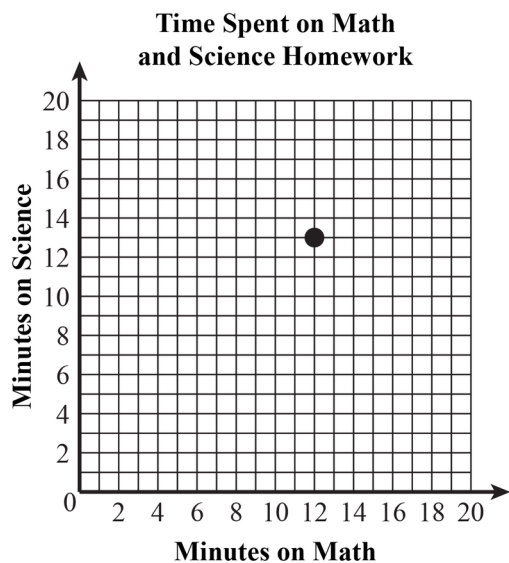
Student reversed the quantities when creating an equivalent ratio of time spent on math homework to time spent on science homework; created the ratio 9:12, instead of 12:16, and graphed the point (9, 12).

B.



Student graphed a point that reflects the ratio of time spent on science to time spent on math, instead of time spent on math to time spent on science; graphed the point (16, 12).

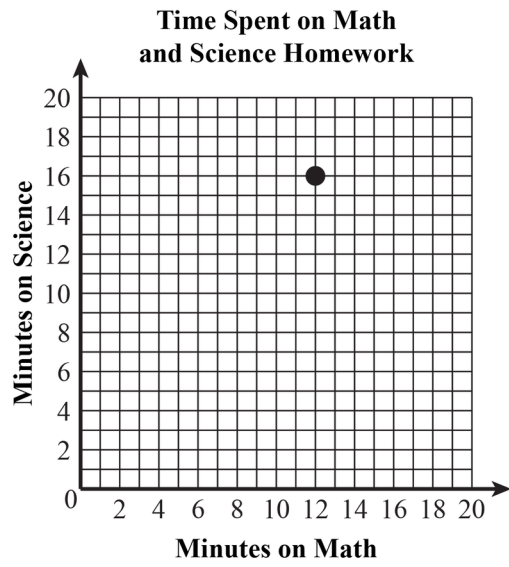
C.



Student used an additive relationship, instead of a multiplicative relationship, to determine the amount of time spent on science homework; thought that since the minutes of math homework increased by 9 ( $3 + 9 = 12$ ), that 9 minutes needed to be added to determine time spent on science homework ( $4 + 9 = 13$ ), and therefore created the ratio 12:13 and graphed the point (12, 13).

D.

Correct.





**Item Id: i116957****Item Type: Constructed Response**

Standards Description:

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Standard(s) for Mathematical Practice:

MP2 Reason abstractly and quantitatively.

In this problem, students make sense of the provided inequality and given quantities. As they evaluate the inequalities for the quantities of each day, students are decontextualizing when they substitute and simplify, and contextualizing when they interpret each simplified inequality as an answer to a question.

Primary Standard: cc:6.EE.B.5

Points Possible: 4

At a carnival in a small town, the entry fee was \$8 per person, and the cost for each ride ticket was \$2.

The inequality below was used to determine if the town met its goal of earning more than \$1,650 each day the carnival was open.

$$8p + 2r > 1,650$$

The following variables were used:

 $p$  = the number of people who attended the carnival $r$  = the number of ride tickets sold

- On Friday, 150 people attended the carnival. A total of 275 ride tickets were sold.
- On Saturday, 110 people attended the carnival. A total of 340 ride tickets were sold.
- On Sunday, 130 people attended the carnival. A total of 305 ride tickets were sold.

For each day the carnival was open, state whether or not the town met its goal. Show all the steps you took to find your answers using the provided inequality.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

**Friday:**

$$8p + 2r$$

$$8(150) + 2(275)$$

$$1200 + 550$$

$$1750$$

\$1,750 was earned on Friday.

1,750 is greater than 1,650, so the town met its goal on Friday.

**Saturday:**

$$8p + 2r$$

$$8(110) + 2(340)$$

$$880 + 680$$

$$1560$$

\$1,560 was earned on Saturday.

1,560 is not greater than 1,650, so the town did not meet its goal on Saturday.

**Sunday:**

$$8p + 2r$$

$$8(130) + 2(305)$$

$$1040 + 610$$

$$1650$$

\$1,650 was earned on Sunday.

1,650 is equal to 1,650, so the town did not meet its goal on Sunday.

**Evidence Statement(s):**

1. Student determined the amount of money raised on Friday, Saturday, and Sunday using substitution and showed all steps in evaluating.
2. Student determined if the amounts of money raised on Friday, Saturday, and Sunday made the inequality true and stated whether or not the town met its goal each day.

**Common Misconception(s):**

- Student may have added the coefficient and the value substituted for each variable instead of multiplying.
- Student may have combined the coefficient and the value substituted for each variable instead of multiplying.
- Student may have interpreted \$1,650 as meeting the goal; perhaps they interpreted the  $>$  sign as “greater than or equal to.”

**Item Id: i111654****Item Type: Selected Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Primary Standard: cc:6.EE.B.7

Points Possible: 1

Karim began his day by drinking  $1\frac{1}{8}$  cups of milk at breakfast. By the end of the day, he drank a total of  $2\frac{2}{3}$  cups of milk.

Which equation and solution correctly represent the amount of milk in cups,  $m$ , Karim drank after breakfast?

A.  $1\frac{1}{8} + m = 2\frac{2}{3}$

$$m = 1\frac{13}{24}$$

Correct.

B.  $1\frac{1}{8} + m = 2\frac{2}{3}$

$$m = 3\frac{19}{24}$$

Student identified the correct equation to represent the situation, but then solved incorrectly; student added rather than subtracted to isolate the variable.

C.  $m - 1\frac{1}{8} = 2\frac{2}{3}$

$$m = 3\frac{19}{24}$$

Student identified the incorrect equation to represent the situation, but then solved correctly.

D.  $m - 1\frac{1}{8} = 2\frac{2}{3}$

$$m = 1\frac{13}{24}$$

Student may have understood how to solve arithmetically, but did not know how to represent the situation algebraically; student misrepresented  $m$  in the equation as the total amount of milk Karim drank throughout the day.

**Item Id: i113272****Item Type: Selected Response**

Standards Description:

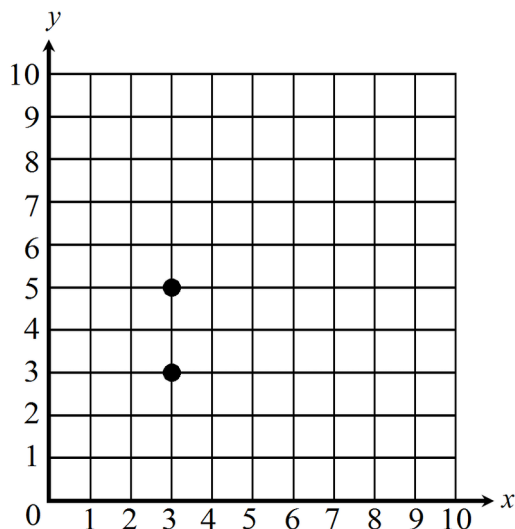
6.G.A.3

Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Primary Standard: cc:6.G.A.3

Points Possible: 1

The coordinate grid below shows two points.



Which points would create a square with the points on the coordinate grid?

A. (4, 5) and (4, 3)

Student made a rectangle; chose coordinates 1 unit away from the original x-values.

B. (5, 4) and (5, 6)

Student made a non-rectangular parallelogram; chose coordinates with y-values 1 greater than the original y-values.

C. (5, 5) **and** (5, 3)

Correct.

D. (5, 5) and (3, 5)

Student reversed the x- and y-coordinates.

8

**Item Id: i138382****Item Type: Constructed Response**

Standards Description:

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Standard(s) for Mathematical Practice:

MP2 Reason abstractly and quantitatively.

Students must decontextualize and manipulate the given information. Students must create a coherent representation of the problem, attending to the meaning of the quantities in the table.

MP4 Model with mathematics.

In Part A, students must fluently model percentages when given different pieces of information. In Part B, students must analyze several pieces of information and determine how to use rate reasoning to map the information over a 120-day period.

8A

Primary Standard: cc:6.RP.A.3

Points Possible: 2

Marianne tracks her progress on her reading assignments in the table below.

	Number of Total Pages Assigned	Number of Pages Read	Percent Read
<b>Week 1</b>	70		90%
<b>Week 2</b>	75	30	
<b>Week 3</b>		40	80%

**Part A**

Determine all missing values for the table above. Show your work.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

**Week 1**

$$0.9 \times 70 = 63 \text{ pages read}$$

**Week 2**

$$30 \div 75 = 0.4$$

40% read

**Week 3**

$$\frac{40}{x} = \frac{80}{100}$$

$$\frac{40}{x} \times \frac{2}{2} = \frac{80}{100}$$

$$x = 50 \text{ total pages assigned}$$

**Evidence Statement(s):**

1. Student demonstrated ratio or rate reasoning to determine the number of pages read in week 1.
2. Student demonstrated ratio or rate reasoning to determine the percent read in week 2.
3. Student demonstrated ratio or rate reasoning to determine the number of total pages assigned in week 3.

**Common Misconception(s):**

- Student may have confused the percent and the whole when finding the number of pages read in week 1.
- Student may have confused the part and the whole when finding the percent read for week 2.
- Student may have confused the percent and the given part when finding the total number of pages assigned in week 3.

**8B**

Primary Standard: cc:6.RP.A.3

Points Possible: 2

**Part B**

Marianne's teacher also assigns essays and quizzes.

- There are 2 essays for every 60 days of school.
- There are 4 quizzes for every 40 days of school.

In 120 days of school, how many essays and how many quizzes will Marianne's teacher give the class? Show or



explain all the steps you used to solve this problem.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$\frac{2}{60} = \frac{x}{120}$$

$$x = 4 \text{ essays}$$

$$\frac{4}{40} = \frac{y}{120}$$

$$y = 12 \text{ quizzes}$$

**Evidence Statement(s):**

1. Student demonstrated ratio or rate reasoning to determine the number of essays Marianne's teacher will assign in a 120-day period.
2. Student demonstrated ratio or rate reasoning to determine the number of quizzes Marianne's teacher will give the class in a 120-day period.

**Common Misconception(s):**

- Student may have used an additive relationship instead of a multiplicative relationship when using ratio or rate reasoning to determine the number of essays and the number of quizzes.
- Student may have represented the multiplicative relationship as the number of essays and/or quizzes.

**Item Id: i138369****Item Type: Multiple Select**

Standards Description:

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Primary Standard: cc:6.EE.B.5

Points Possible: 2

Which of the following can be substituted for  $y$  to make the inequality below true?

$$24 > 6 + 3y$$

Select **all** that apply.

A. 2.75

Correct.

B. 5

Correct.

C. 6

Student interpreted the  $>$  sign as "greater than or equal to."

D. All whole numbers

Student identified a set that is true for whole numbers less than 6 but not all whole numbers.

E. All numbers less than 6

Correct.

F. All numbers greater than 6

Student misinterpreted the inequality sign.

10

**Item Id: i111717****Item Type: Multiple Select**

Standards Description:

6.EE.A.2.a Write expressions that record operations with numbers and with letters standing for numbers.

Primary Standard: cc:6.EE.A.2.a

Points Possible: 1

Which phrases are equivalent to  $y - 6$ ?Select **all** that apply.**A. a number minus 6**

Correct.

**B. 6 less than a number**

Correct.

C. 6 decreased by a number

Student switched the subtrahend and the minuend; did not recognize  $y$  is being decreased by 6.

D. a number taken away from 6

Student switched the subtrahend and the minuend; did not recognize 6 is being taken away from  $y$ .

E. the quotient of a number and 6

Student thought that the term "quotient" refers to subtraction.

**Item Id: i139158****Item Type: Constructed Response**

Standards Description:

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

Standard(s) for Mathematical Practice:

MP2 Reason abstractly and quantitatively.

In this problem, students make sense of quantities and their relationship as they decontextualize the given situation and represent it as an equation that can be solved. Also, students contextualize the quantity that solves their equation.

Primary Standard: cc:6.EE.B.7

Secondary Standard(s): cc:6.EE.A.3

Points Possible: 2

Madjeen jogs around the pond by her house twice a day. In the morning, she jogs 3.5 laps around the pond. In the evening, she jogs 1 lap around the pond. Madjeen jogs a total of 5.4 miles.

Write and solve an equation to find out how many miles are in each lap around the pond.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$m =$  miles in one lap

$$3.5m + m = 5.4$$

$$4.5m = 5.4$$

$$\frac{4.5m}{4.5} = \frac{5.4}{4.5}$$

$$m = 1.2$$

Each lap around the pond is 1.2 miles.

**Evidence Statement(s):**

1. Student wrote an equation that relates the number of laps around the pond to the number of miles Madjeen jogs.
2. Student solved for the number of miles in each lap around the pond.

**Common Misconception(s):**

- Student wrote and solved an equation that did not account for the total number of laps Madjeen jogs; may have written the equation  $3.5m = 5.4$  and then solved for  $m$ .
- Student related the quantities by using an additive relationship instead of a multiplicative relationship; may have written the equation  $3.5 + m = 5.4$  and then solved for  $m$ .

12

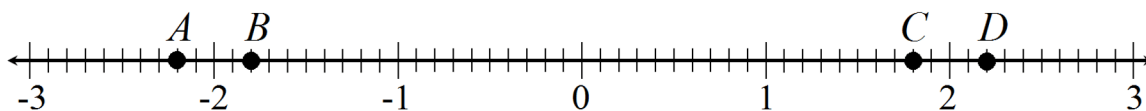
**Item Id: i111731****Item Type: Selected Response**

Standards Description:

6.NS.C.6.c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

Primary Standard: cc:6.NS.C.6.c

Points Possible: 1

Points  $A$ ,  $B$ ,  $C$ , and  $D$  are shown on the number line below.Which point represents the position of  $-2.2$  on the number line?

- A.  $A$  Correct.
- B.  $B$  Student misinterpreted the value of negative numbers and thought that  $-2.2$  was closer to zero than  $-2$ , OR student started at  $-2$  but then moved  $0.2$  in the positive direction instead of the negative direction.
- C.  $C$  Student ignored the negative sign when identifying  $2$  but then used the negative sign to move  $0.2$  to the left of  $2$ .
- D.  $D$  Student ignored the negative sign and selected the positive value.

**Item Id: i129609****Item Type: Selected Response**

Standards Description:

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Primary Standard: cc:6.NS.C.5

Points Possible: 1

Clara makes and sells paintings. The supplies needed to make each painting cost her \$13.00. She earns \$75.00 for each painting she sells.

Which set of integers **best** represents these values?

A.  $-13$  and  $-75$ 

Student interpreted "earns" as negative.

**B.**  $-13$  and  $75$ 

Correct.

C.  $13$  and  $-75$ 

Student interpreted "cost" as positive and "earns" as negative, or took the opposites.

D.  $13$  and  $75$ 

Student interpreted "cost" as positive or took the numbers out of the question as is.

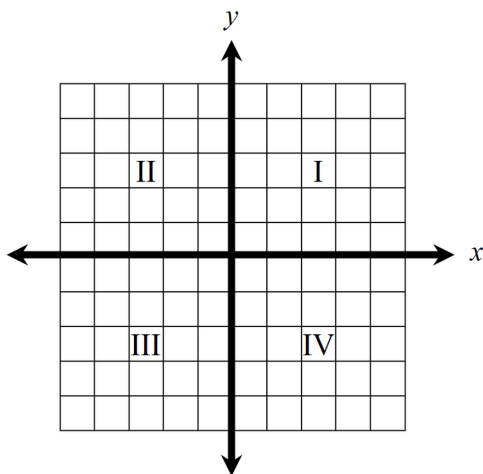
**Item Id: i112416****Item Type: Selected Response**

Standards Description:

6.NS.C.6.b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

Primary Standard: cc:6.NS.C.6.b

Points Possible: 1

The variables  $a$  and  $b$  are positive numbers.In which quadrant is  $(-a, -b)$  found?

- A. I Student chose a quadrant with 2 positive coordinates.
- B. II Student chose a quadrant with only a negative x-coordinate.
- C. III Correct.
- D. IV Student chose a quadrant with only a negative y-coordinate.



15

**Item Id: i112477****Item Type: Multiple Select**

Standards Description:

6.RP.A.2 Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship.

Primary Standard: cc:6.RP.A.2

Points Possible: 1

At a store, 2 notebooks cost \$6. Each notebook costs the same amount of money.

Which statements are true?

Select **all** that apply.

**A. The store charges \$3 per notebook.**

Correct.

B. The store charges \$4 per notebook.

Student represented the unit rate as the difference between the cost and the number of notebooks ( $6 - 2 = 4$ ).

**C. The store charges \$15 for 5 notebooks.**

Correct.

D. The store charges \$13 for 9 notebooks.

Student identified a statement where the difference between the cost and the number of notebooks ( $13 - 9 = 4$ ) is the same as it is in the question stem ( $6 - 2 = 4$ ), OR student added the same number (7) to the number of notebooks (2) and the cost (\$6).

E. The store charges \$4 for 12 notebooks.

Student reversed the ratio of the number of notebooks and the cost to calculate the unit rate (3 notebooks per dollar), and therefore thought this ratio was equivalent.

Item Id: i130354

Item Type: Selected Response

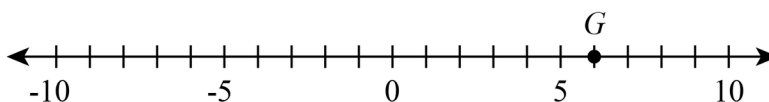
Standards Description:

6.NS.C.6.a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.

Primary Standard: cc:6.NS.C.6.a

Points Possible: 1

Use the number line below to answer the question.

Which statement about the location of point  $G$  on the number line is true?

- |   |   |
|---|---|
| A. The location of point $G$ can be described as $-6$ .   | Student did not recognize that the opposite of 6 is on the opposite side of 0 on the number line, OR interpreted $-6$ as $ -6 $ .                                       |
| B. The location of point $G$ can be described as the opposite of 6.                                 | Student interpreted the opposite of 6 as 6; may have thought that 6 is its own opposite, OR confused "opposite" with "absolute value."                                  |
| <b>C. The location of point <math>G</math> can be described as the opposite of <math>-6</math>.</b> | Correct.  |
| D. The location of point $G$ can be described as the opposite of the opposite of $-6$ .             | Student interpreted the opposite of the opposite of $-6$ as 6; perhaps confused the opposite of a number as being the same as the opposite of the opposite of a number. |

**Item Id: i130557****Item Type: Selected Response**

Standards Description:

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Primary Standard: cc:6.EE.B.6

Points Possible: 1

Jackson has  $h$  hats. Davonte has half as many hats as Jackson. Princeton has 5 hats.

Which expression can be used to find the number of hats they have in total?

A.  $h + \frac{1}{2} + 5$

Student expressed the number of Davonte's hats as  $1/2$  instead of  $1/2$  times  $h$ .

B.  $h + \frac{h}{2} + 5$

Correct.

C.  $h + 2h + 5$

Student interpreted "half as many" to mean "twice as many," OR thought that  $1/2$  times  $h$  is equivalent to 2 times  $h$ .

D.  $h + \frac{1}{2}h - 5$

Student subtracted the number of Princeton's hats instead of adding.

**Item Id: i138112****Item Type: Multiple Select**

Standards Description:

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Primary Standard: cc:6.NS.C.5

Points Possible: 1

Which situations can be represented by the integer  $-5$ ?Select **all** that apply.**A. Jarvis spent \$5.**

Correct.

**B. Abdul lost 5 points.**

Correct.

C. The bird rose 5 meters.

Student did not recognize that "rose" indicates a positive integer in this context.

D. A plant grew 5 centimeters.

Student did not recognize that "grew" indicates a positive integer in this context.

**E. The temperature decreased 5 degrees.**

Correct.

**Item Id: i113261****Item Type: Constructed Response**

Standards Description:

6.NS.C.7.c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

Standard(s) for Mathematical Practice:

MP3 Construct viable arguments and critique the reasoning of others.

Students must respond to two claims by evaluating them and determining what circumstances could make the statements true.

Primary Standard: cc:6.NS.C.7.c

Secondary Standard(s): cc:6.NS.C.7.d

Points Possible: 2

On Monday, the coldest temperature outside was 2 degrees Fahrenheit. On Tuesday, Ms. Perkins tells her students that the coldest temperature outside has an absolute value of 4 degrees.

- Rachel says that Tuesday's coldest temperature could be greater than Monday's coldest temperature.
- Tom says that Tuesday's coldest temperature could be less than Monday's coldest temperature.

State whether each student's statement is true or false, and justify your answers.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$|4| = 4$$

$$|-4| = 4$$

Rachel's statement is true because Tuesday's coldest temperature could be 4 degrees, which is greater than 2 degrees.

Tom's statement is true because Tuesday's coldest temperature could be  $-4$  degrees, which is less than 2 degrees.

**Evidence Statement(s):**

1. Student demonstrated understanding that Tuesday's coldest temperature could be positive 4 degrees or negative 4 degrees because both have an absolute value of 4 degrees.
2. Student correctly compared Tuesday's two potential coldest temperatures (4 degrees and -4 degrees) to Monday's coldest temperature (2 degrees).

**Common Misconception(s):**

- Student misinterpreted the absolute value of 4 degrees as meaning that Tuesday's coldest temperature must be positive 4 degrees; thought that only Rachel's claim is correct.

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----

**Item Id: i112644****Item Type: Selected Response**

Standards Description:

6.EE.A.3 Apply the properties of operations to generate equivalent expressions.

Primary Standard: cc:6.EE.A.3

Points Possible: 1

If Expression A is equivalent to Expression B, which number belongs in the blank of Expression B below?

Expression A:  $2y + y + 3y + y$ Expression B:  $\underline{\quad}y$ 

A. 4

Student counted that there are 4 y's, ignoring all coefficients.

B. 5

Student added the coefficients 2 and 3, ignoring the other coefficients.

C. 6

Student multiplied all the coefficients, OR student only multiplied the coefficients 2 and 3, ignoring the other coefficients.

**D. 7**

Correct.

**Item Id: i113260****Item Type: Multiple Select**

Standards Description:

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Primary Standard: cc:6.NS.C.8

Points Possible: 1

Sheldon is creating a graph to represent the trip he takes from his home to his favorite clothing store. In his graph, one unit on the coordinate plane is equal to one mile. He draws a point at  $(4, 3)$  to represent the location of his house. The store is 5 miles away from his house.

Which coordinate pairs could represent the location of Sheldon's favorite clothing store?

Select **all** that apply.

- |              |  |
|--------------|--|
| A. $(-1, 3)$ | Correct.   |
| B. $(4, -2)$ | Correct.   |
| C. $(4, 5)$  | Student substituted 5 as the y-coordinate instead of moving the y-coordinate 5 units.            |
| D. $(4, 8)$  | Correct.   |
| E. $(5, 3)$  | Student substituted 5 as the x-coordinate based on "5 miles" and kept the y-coordinate the same. |



**Item Id: i113054****Item Type: Selected Response**

Standards Description:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Primary Standard: cc:6.NS.A.1

Points Possible: 1

A batch of muffins requires  $\frac{3}{4}$  of a cup of flour.

How many batches of muffins can be made from  $5\frac{1}{3}$  cups of flour?

- A.  $\frac{9}{64}$  Student correctly converted the mixed number into a fraction, but multiplied the reciprocal of  $16/3$  ( $3/16 \times 3/4$ ), instead of multiplying the reciprocal of  $3/4$  ( $16/3 \times 4/3$ ); perhaps did not recognize that the quotient should be greater than 1 because  $3/4$  is smaller than  $5\frac{1}{3}$ .
- B. 4 Student correctly converted the mixed number into an improper fraction, but multiplied instead of dividing.
- C.  $5\frac{4}{9}$  Student divided  $1/3$  by  $3/4$ , but left the whole number unchanged.
- D.  $7\frac{1}{9}$  Correct.

**Item Id: i138708****Item Type: Selected Response**

Standards Description:

6.EE.B.8 Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form  $x > c$  or  $x < c$  have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Primary Standard: cc:6.EE.B.8

Points Possible: 1

A teacher wrote the inequality below to represent the number of students,  $s$ , that are in each classroom.

$$s > 26$$

Which situation is correctly represented by the inequality?

- |  |  |
|--|--|
| A. There are at least 26 students in each classroom.         | Student selected a situation that can be represented by $s$ is greater than or equal to 26; may have thought that 26 was a solution to the inequality. |
| B. There are at most 26 students in each classroom.          | Student selected a situation that can be represented by $s$ is less than or equal to 26; possibly confused "at most" with "greater than."              |
| C. There are less than 26 students in each classroom.        | Student selected a situation that can be represented by $s$ is less than 26; possibly confused the "less than" and "greater than" symbols.             |
| <b>D. There are more than 26 students in each classroom.</b> | Correct.   |

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**Item Id: i138167****Item Type: Selected Response**

Standards Description:

6.NS.C.7.d Distinguish comparisons of absolute value from statements about order.

Primary Standard: cc:6.NS.C.7.d

Points Possible: 1

A person dove more than 100 feet below sea level.

Which value could represent the elevation, in feet, that the person dove?

A. -125

Correct.

B. -50

Student chose a negative number greater than -100, but not a depth greater than 100 feet below sea level.

C. 60

Student chose a value less than 100 feet above sea level; possibly interpreted "below" to mean less than 100.

D. 150

Student chose a value more than 100 feet above sea level instead of below.

25

**Item Id: i112155****Item Type: Math Short Answer**

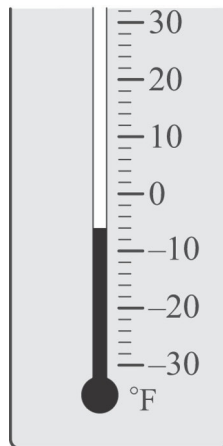
Standards Description:

6.NS.C.6.c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

Primary Standard: cc:6.NS.C.6.c

Points Possible: 1

Use the thermometer below to answer the question.



What is the temperature, in degrees Fahrenheit, shown on the thermometer above to the nearest integer?

Respond in the space provided.

*If your test is on paper, write your answer on the answer sheet.***Correct Answer:**

-6° Fahrenheit

**Item Id: i129611****Item Type: Selected Response**

Standards Description:

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.

Primary Standard: cc:6.EE.A.1

Points Possible: 1

Which value is equivalent to the expression below?

$$\left(\frac{2}{3}\right)^3$$

A.  $\frac{6}{3}$

Student multiplied the numerator by the exponent (3) and kept the denominator the same.

B.  $\frac{6}{9}$

Student multiplied the numerator and denominator by the exponent (3).

C.  $\frac{8}{3}$

Student only cubed the numerator.

D.  $\frac{8}{27}$

Correct.

**Item Id: i112584****Item Type: Multiple Select**

Standards Description:

6.NS.C.7.c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

Primary Standard: cc:6.NS.C.7.c

Points Possible: 1

A change in the water level of a swimming pool is recorded as  $-12$  inches.

Which of the following statements **must** be true?

Select **all** that apply.

A. The water level increased by 12 inches.

Student determined the absolute value of  $-12$ , but thought that since the absolute value is positive, an increase in water level is being represented.

B. The water level increased by  $|-12|$  inches.

Student did not recognize that a negative integer represents a decrease in water level.

**C. The water level decreased by  $|-12|$  inches.**

Correct.

D. The water level has a height of  $-12$  inches.

Student misinterpreted the change in water level as the actual water level; may have assumed that the water level started at 0 and was therefore now at  $-12$  inches.

**E. The water level experienced a change of 12 inches.**

Correct.

**Item Id: i112874****Item Type: Selected Response**

Standards Description:

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Primary Standard: cc:6.NS.C.8

Points Possible: 1

The points  $(-3, 8)$  and  $(4, 8)$  are plotted on a coordinate plane.

Which expression represents the distance between the two points?

A.  $|-3| + |4|$

Correct.

B.  $|-3| + |8|$

Student used the x-coordinate and y-coordinate of the first point, OR student used the x-coordinate of the first point and the y-coordinate of the second point instead of the x-coordinate of the second point.

C.  $|4| - |-3|$

Student represented the difference between the two absolute values instead of the sum.

D.  $|8| - |-3|$

Student used the x-coordinate and y-coordinate of the first point and represented the difference between the two absolute values instead of the sum, OR student used the x-coordinate of the first point and the y-coordinate of the second point instead of the x-coordinate of the second point and represented the difference between the two values instead of the sum.

**Item Id: i116514****Item Type: Multiple Select**

Standards Description:

6.NS.C.6.b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

Primary Standard: cc:6.NS.C.6.b

Points Possible: 1

Two points are graphed on a coordinate grid. Point  $A$  is located at  $(-8, -3)$ . Point  $B$  is created by reflecting point  $A$  over an axis.

Which coordinates could be the coordinates of point  $B$ ?

Select **all** that apply.

A.  $(-8, 3)$

Correct.

B.  $(-3, -8)$

Student switched the x- and y-coordinates; did not recognize that  $(-8, -3)$  and  $(-3, -8)$  are in the same quadrant and therefore cannot represent a reflection over an axis.

C.  $(3, -8)$

Student correctly changed the sign of only one coordinate but switched the x- and y-coordinates.

D.  $(8, 3)$

Student changed the signs of both coordinates, representing a reflection over both axes instead of one axis.

E.  $(8, -3)$

Correct.



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**Item Id: i112443****Item Type: Selected Response**

Standards Description:

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Primary Standard: cc:6.EE.A.4

Points Possible: 1

Which two expressions are equivalent?

1.  $b + b + b + b$
2.  $b^4$
3.  $b + 4$
4.  $4b$

A. 1 and 2

Student confused addition of variables with multiplication of variables.

**B. 1 and 4**

Correct.

C. 2 and 3

Student confused adding a constant with an exponent.

D. 3 and 4

Student confused the constant of 4 with the coefficient.

**Item Id: i112577****Item Type: Selected Response**

Standards Description:

6.NS.C.7.a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.

Primary Standard: cc:6.NS.C.7.a

Points Possible: 1

Which comparison **and** explanation are correct?A.  $-16 < 4$  because 4 is farther away from zero.

Student chose the correct comparison but incorrectly identified the reasoning; incorrectly identified 4 as being farther away from zero than -16, and thought that the number farther away from zero was larger.

**B.  $-16 < 4$  because 4 is to the right of  $-16$  on a number line.**

Correct.

C.  $-16 > 4$  because  $-16$  is farther away from zero.

Student incorrectly believed that because -16 is farther away from zero than 4, it has a larger value.

D.  $-16 > 4$  because  $-16$  is to the left of 4 on a number line.

Student incorrectly identified a number to the left as being larger than a number to the right on a number line.

**Item Id: i130205****Item Type: Multiple Select**

Standards Description:

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Primary Standard: cc:6.NS.C.5

Points Possible: 1

Three bike riders began a bike ride from their school. All three bike riders rode either north, south, or a combination of north and south.

The table below shows each bike rider's position relative to their school after an hour. A positive number represents a position, in miles, to the north of their school. A negative number represents a position, in miles, to the south of their school.

<b>Bike Rider</b>	<b>Position Relative to Their School after an Hour</b>
Bike Rider 1	0
Bike Rider 2	-5.3
Bike Rider 3	2.8

Which statements **must** be true?

Select **all** that apply.

A. Bike Rider 1 rode the least amount of miles.

Student did not recognize that 0 in this context represents the position of Bike Rider 1's school; thought that since Bike Rider 1's position is 0, they must have ridden 0 miles.

**B. Bike Rider 1 was back to their school after an hour.**

Correct.

**C. Bike Rider 2 was farthest away from their school after an hour.** Correct.

D. Bike Rider 3 was farthest away from their school after an hour.

Student thought that a positive number represents the greatest amount of miles from the school; did not recognize that Bike Rider 2 was farthest from their school, even though their position is recorded as negative.

**E. Bike Rider 2 and Bike Rider 3 were not back to their school after an hour.** Correct.

**Item Id: i112352****Item Type: Multiple Select**

Standards Description:

6.NS.C.7.b Write, interpret, and explain statements of order for rational numbers in real-world contexts.

Primary Standard: cc:6.NS.C.7.b

Points Possible: 2

Which statements about temperature are true?

Select **all** that apply.**A.  $0^{\circ}\text{F}$  is warmer than  $-3^{\circ}\text{F}$  because  $0 > -3$ .**

Correct.

**B.  $-12^{\circ}\text{F}$  is colder than  $-5^{\circ}\text{F}$  because  $-12 < -5$ .**

Correct.

**C.  $-22^{\circ}\text{F}$  is warmer than  $16^{\circ}\text{F}$  because  $-22 > 16$ .**

Student did not recognize that a negative value is colder than a positive value; thought that since 22 is greater than 16, -22 is greater and therefore warmer.

**D.  $-4.2^{\circ}\text{F}$  is colder than  $-4.1^{\circ}\text{F}$  because  $-4.2 < -4.1$ .**

Correct.

**E.  $-1.5^{\circ}\text{F}$  is warmer than  $-1.4^{\circ}\text{F}$  because  $-1.5 > -1.4$ .**

Student did not recognize that -1.5 is less than, and therefore colder than, -1.4; may not have understood that -1.5 is farther to the left of 0 than -1.4.

Item Id: i138725

Item Type: Selected Response

Standards Description:

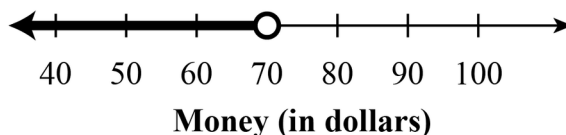
6.EE.B.8

Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form  $x > c$  or  $x < c$  have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Primary Standard: cc:6.EE.B.8

Points Possible: 1

The number line below represents how much money, in dollars, each person commits to spending in one week.



Which statement best describes the amount of money that each person commits to spending?

A. Each person commits to spending exactly \$70.

Student interpreted the open circle as inclusive and did not take the shading of the line into account.

B. Each person commits to spending at least \$70.

Student interpreted "at least" to mean "all values less than \$70" or "all values less than and including \$70;" may have interpreted the open circle as inclusive.

C. Each person commits to spending less than \$70.

Correct.

D. Each person commits to spending between \$40 and \$70.

Student did not recognize that the inequality has infinitely many solutions; thought that since 40 is the smallest defined point on the bolded line that the solution includes any number within the range of \$40-\$70.

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**Item Id: i130351****Item Type: Multiple Select**

Standards Description:

6.NS.C.6.a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.

Primary Standard: cc:6.NS.C.6.a

Points Possible: 1

Which of the following are true?

Select **all** that apply.

A.  $-(-9) = 9$

Correct.

B.  $-(-5) = -5$

Student did not understand that the opposite of a negative number (-5) should be positive.

C.  $-(10) = -10$

Correct.

**D. The opposite of 8 will be 8 units to the left of 0 on a number line.**

Correct.

E. The opposite of every number will be to the left of 0 on a number line.

Student did not recognize that the opposites of negative numbers will be to the right of 0 on a number line; only considered positive numbers.

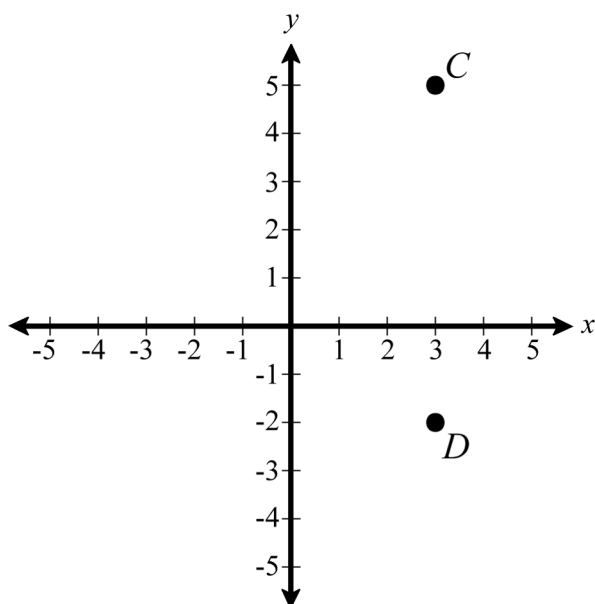
**Item Id: i112940****Item Type: Selected Response**

Standards Description:

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Primary Standard: cc:6.NS.C.8

Points Possible: 1

What is the distance, in units, between points  $C$  and  $D$  on the graph below?

- A. 3 Student added 5 and -2 instead of adding their absolute values, OR student chose the x-value of the two points.
- B. 5 Student chose the distance between point C and the x-axis.
- C. 7 Correct.



D. 8

Student counted the distance between the points by counting the tick marks instead of the units, including the starting point and end point.

# Interim Assessment 4

## Mathematics

### Grade 6

student: \_\_\_\_\_

teacher: \_\_\_\_\_

school: \_\_\_\_\_



**DIRECTIONS**

In this assessment you will answer a total of 10 questions, including 2 constructed-response question(s). Mark all of your answers to the questions on the answer sheet provided.

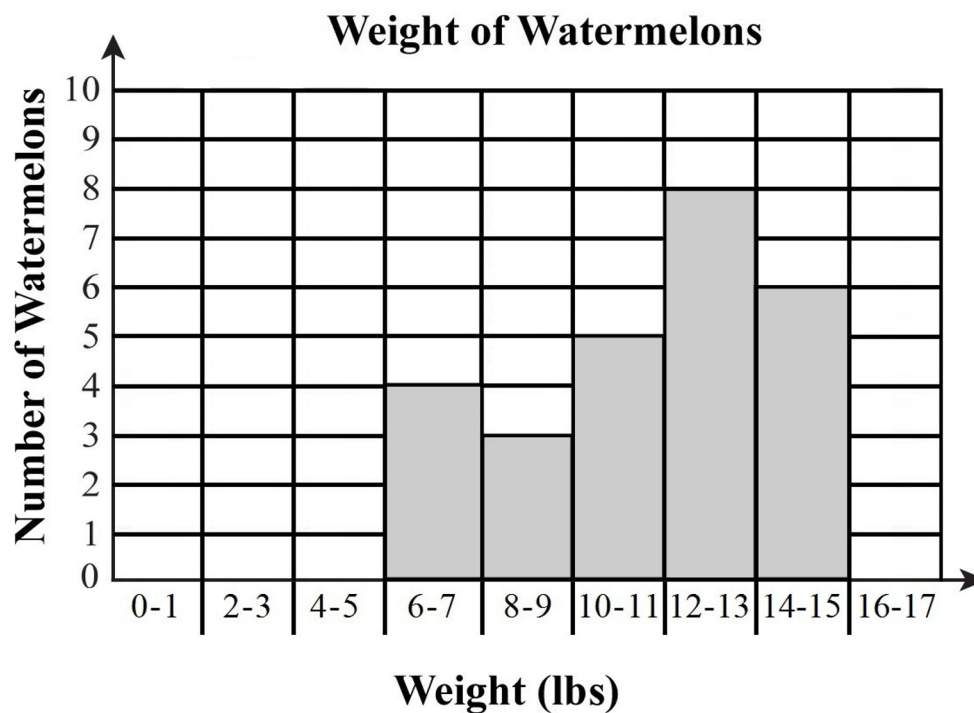
You may use this test booklet to work out the questions, but remember to mark all of your answers on the answer sheet. For constructed-response questions, record your answers directly on the page in the test booklet.

***Calculator Section***

*You may use a calculator to solve the questions in this section.*



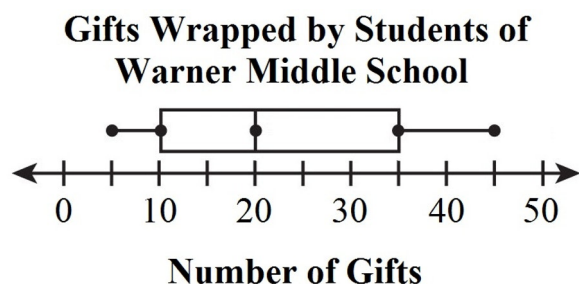
1. The owner of a grocery store makes a histogram to show the spread of the weights, rounded to the nearest pound (lb), of all the watermelons in the store.



Based on the data in the graph, how many watermelons did the grocery store weigh?

- A. 5
- B. 8
- C. 15
- D. 26

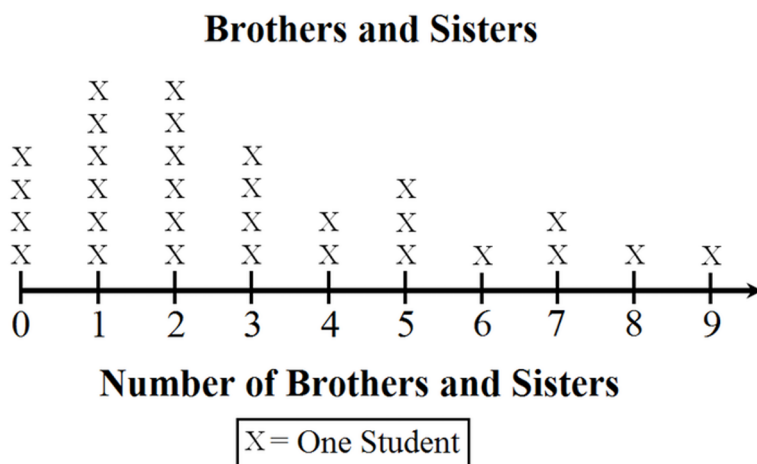
2. A group of sixth-grade students at Warner Middle School held a fundraiser to raise money for a field trip. The group leader asked each student in the group a question and recorded the answers. The box-and-whisker plot below represents the answers to the question.



Based on the box-and-whisker plot, which question did the group leader ask each student?

- A. How many gifts did you give at the fundraiser?
- B. How many gifts did you wrap at the fundraiser?
- C. How many hours did you work at the fundraiser?
- D. How many minutes did it take you to wrap each gift at the fundraiser?

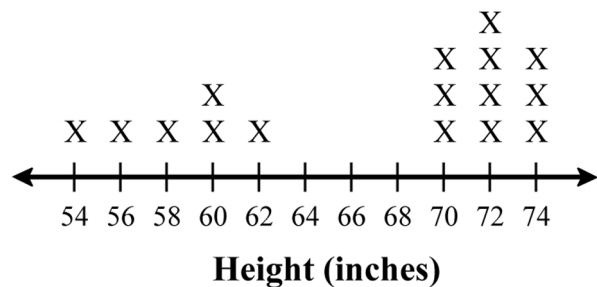
3. A teacher asked each student how many brothers and sisters they have. The teacher recorded the data in the line plot below.



Which statement **best** describes the measure of center that should be used to represent the data in the line plot above?

- A. The measure of center that best represents the data is the mean because the shape of the data is symmetrical.
- B. The measure of center that best represents the data is the median because the shape of the data is symmetrical.
- C. The measure of center that best represents the data is the mean because the shape of the data is not symmetrical.
- D. The measure of center that best represents the data is the median because the shape of the data is not symmetrical.

4. The heights of people in a random sample are shown in the line plot below.



Key
X = 1 person

Based on the data above, which of the following statements are true?

Select **all** that apply.

- A. There are four outliers.
- B. The average height of people sampled is about 72 inches.
- C. The average height of people sampled is about 67 inches.
- D. There is more variability in height among taller people sampled than there is among shorter people sampled.
- E. There is more variability in height among shorter people sampled than there is among taller people sampled.



**Non-Calculator Section**

You may **not** use a calculator to solve the questions in this section.

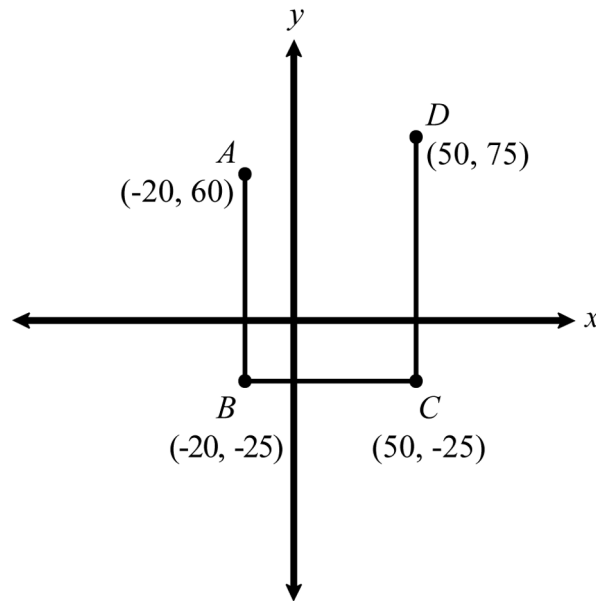


5. Which questions can be answered using a measure of center?

Select **all** that apply.

- A. In which month were the test scores most similar?
- B. Did the daily high temperatures vary more in March or April?
- C. What is the average amount of time it takes you to do your homework?
- D. What number summarizes the amount of gas your car uses each week?
- E. What is the difference in weight between the heaviest package and lightest package delivered to your house?

6. There are three hallways at Wilson Middle School, as represented in the coordinate plane below. Four points are plotted on the coordinate plane to represent the end of each hallway.



**Part A**

Each unit represents 1 meter. What is the total length of the three hallways? Show or explain your work.

Respond in the space provided.

**Part B**

The Wilson Middle School flagpole is 28 meters to the right of point  $D$ . Give the coordinates of the point that represents the location of the school's flagpole.

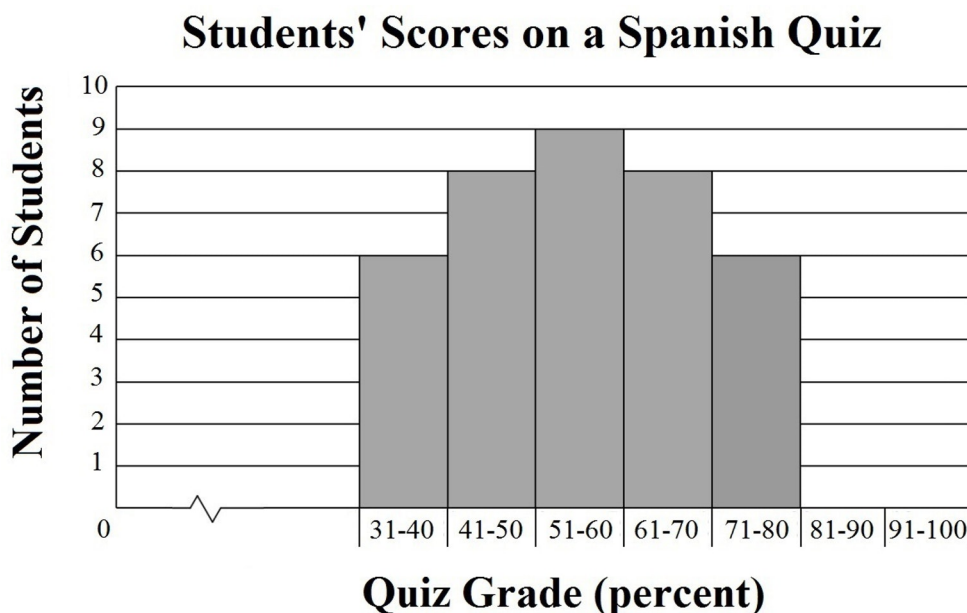
Respond in the space provided.

7. Which of the following questions are statistical questions?

Select **all** that apply.

- A. Who is Peter's favorite athlete?
- B. How many pets does Theo have?
- C. How many hours per night did Lisa sleep last month?
- D. How many instruments does each member of the school band play?
- E. Who is the favorite music artist of each member of the football team?

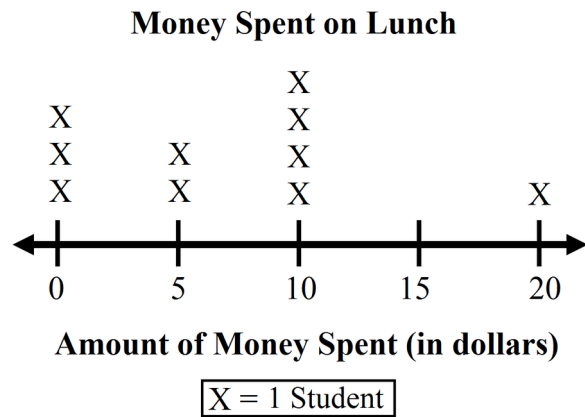
8. A teacher made a histogram of the scores on a Spanish quiz.



Which statement about the histogram above is true?

- A. The distribution is symmetric because there is a vertical line of symmetry.
- B. The distribution is skewed right because the histogram is closer to the right side of the chart area.
- C. The distribution is skewed left because the difference between 80 and 100 is less than the difference between 31 and 0.
- D. The distribution is skewed right because the difference between 80 and 100 is less than the difference between 31 and 0.

9. Bethany asked her classmates how much money they spent on lunch every week. She then made the line plot shown below from her data set of responses.



Which data set did Bethany use to make the line plot?

- A. \$3, \$2, \$4, \$1
- B. \$0, \$5, \$10, \$20
- C. \$3, \$3, \$3, \$2, \$2, \$4, \$4, \$4, \$4, \$1
- D. \$0, \$0, \$0, \$5, \$5, \$10, \$10, \$10, \$10, \$20

- 10.** Rickie played eight rounds of miniature golf in June and eight rounds of miniature golf in July. He recorded his score for each round.

Rickie's mother asked him if his scores varied more in June or July.

Rickie claims that a measure of center will answer his mother's question. Is Rickie's claim correct?

- If Rickie's claim is correct, explain why.
- If Rickie's claim is incorrect, state what type of measure he should use to answer his mother's question and explain why.

Respond in the space provided.

# Assessment Analysis Guide

## Interim Assessment 4

### **Mathematics**

### **Grade 6**



1

**Item Id: i112500****Item Type: Selected Response**

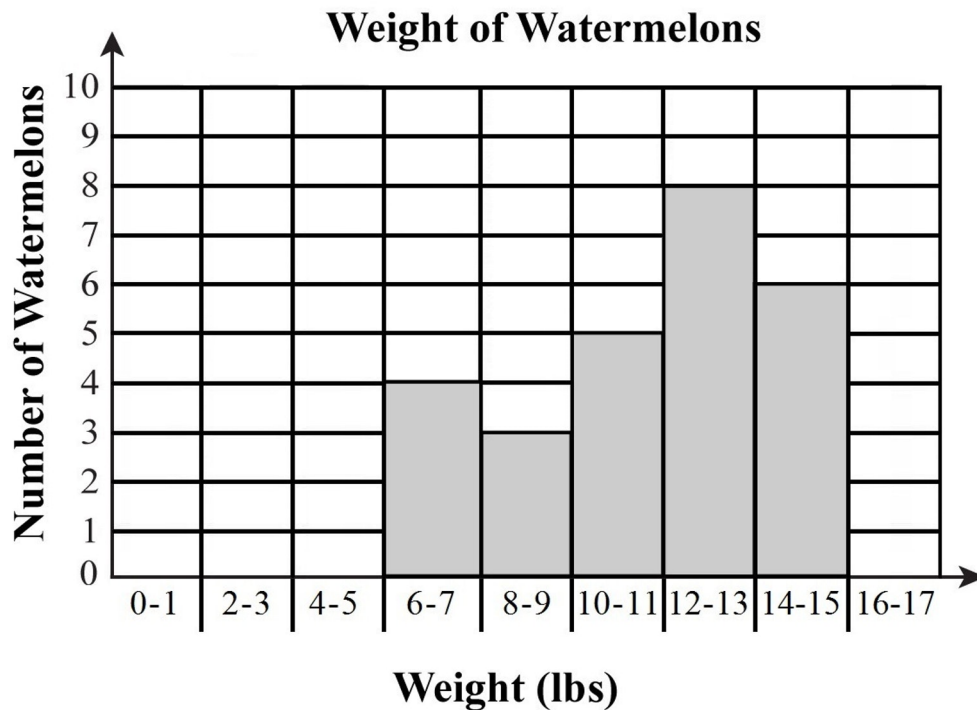
Standards Description:

6.SP.B.5.a Reporting the number of observations.

Primary Standard: cc:6.SP.B.5.a

Points Possible: 1

The owner of a grocery store makes a histogram to show the spread of the weights, rounded to the nearest pound (lb), of all the watermelons in the store.



Based on the data in the graph, how many watermelons did the grocery store weigh?

- A. 5 Student chose the number of bars on the graph.
- B. 8 Student chose the y-value of the tallest bar.



**Item Id: i111787****Item Type: Selected Response**

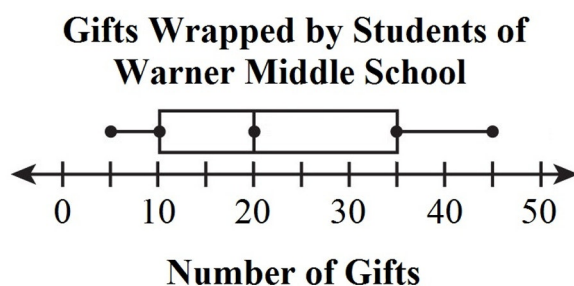
Standards Description:

6.SP.B.5.b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

Primary Standard: cc:6.SP.B.5.b

Points Possible: 1

A group of sixth-grade students at Warner Middle School held a fundraiser to raise money for a field trip. The group leader asked each student in the group a question and recorded the answers. The box-and-whisker plot below represents the answers to the question.



Based on the box-and-whisker plot, which question did the group leader ask each student?

- A. How many gifts did you give at the fundraiser? Student chose an option based on "Number of Gifts" but did not use the title of the box-and-whisker plot.
- B. How many gifts did you wrap at the fundraiser? Correct.
- C. How many hours did you work at the fundraiser? Student chose a question that makes sense in the context but is not represented in the box-and-whisker plot.
- D. How many minutes did it take you to wrap each gift at the fundraiser? Student did not interpret the axis label correctly and interpreted the units as minutes.

3

Item Id: i113257

Item Type: Selected Response

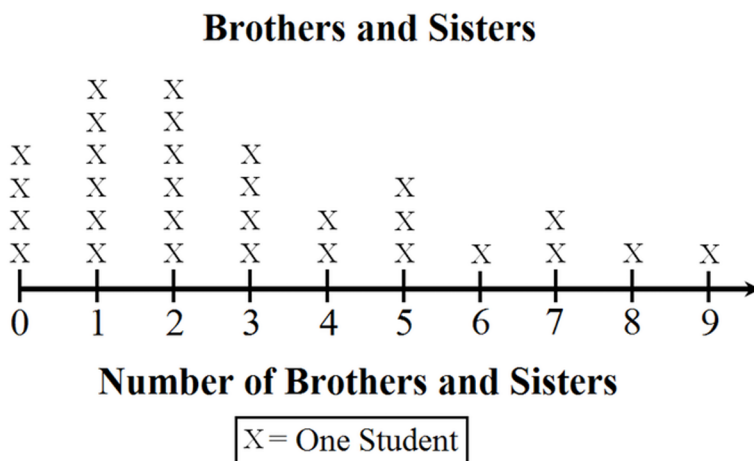
Standards Description:

6.SP.B.5.d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Primary Standard: cc:6.SP.B.5.d

Points Possible: 1

A teacher asked each student how many brothers and sisters they have. The teacher recorded the data in the line plot below.



Which statement **best** describes the measure of center that should be used to represent the data in the line plot above?

- A. The measure of center that best represents the data is the mean because the shape of the data is symmetrical. Student incorrectly described the shape of the data set and chose the measure of center that would best represent the data if the data set were symmetrical.
  
- B. The measure of center that best represents the data is the median because the shape of the data is symmetrical. Student identified the correct measure of center but based it on an incorrect description of the shape of the data set.

C. The measure of center that best represents the data is the mean because the shape of the data is not symmetrical. Student correctly described the shape of the data set but chose the incorrect measure of center.

**D. The measure of center that best represents the data is the median because the shape of the data is not symmetrical.** Correct.

4

**Item Id: i113013**

**Item Type: Multiple Select**

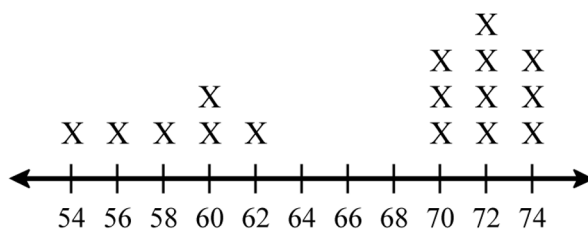
Standards Description:

6.SP.B.5.c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Primary Standard: cc:6.SP.B.5.c

Points Possible: 1

The heights of people in a random sample are shown in the line plot below.



**Height (inches)**

Key
X = 1 person

Based on the data above, which of the following statements are true?

Select **all** that apply.

A. There are four outliers.

Student misunderstood the term "outliers" to mean the data points representing the outermost values.

B. The average height of people sampled is about 72 inches.

Student recognized that there were more taller people than shorter people in the data, and found the average height of the taller people instead of the entire data set, OR student believed "average" meant most common.

**C. The average height of people sampled is about 67 inches.** Correct.

D. There is more variability in height among taller people sampled than there is among shorter people sampled.

Student misinterpreted the data in context as representing more variability among taller people; perhaps confused the concept of variability with the concept of concentration or clustering, OR thought that since there are more data points for taller people, there is more variability among taller people.

**E. There is more variability in height among shorter people sampled than there is among taller people sampled.** Correct.

**Item Id: i139105****Item Type: Multiple Select**

Standards Description:

6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Primary Standard: cc:6.SP.A.3

Points Possible: 1

Which questions can be answered using a measure of center?

Select **all** that apply.

- A. In which month were the test scores most similar? Student did not recognize that this question can only be answered using a measure of variation; perhaps associated the word "most" with a measure of center.
- B. Did the daily high temperatures vary more in March or April? Student did not recognize that this question can only be answered using a measure of variation; perhaps associated monthly temperatures with the word "average" and therefore thought a measure of center should be used.
- C. What is the average amount of time it takes you to do your homework? Correct.
- D. What number summarizes the amount of gas your car uses each week? Correct.
- E. What is the difference in weight between the heaviest package and lightest package delivered to your house? Student did not recognize that this question can only be answered using a measure of variation; perhaps thought they needed a measure of center to compare data sets.



6
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**Item Id: i111941****Item Type: Constructed Response**

Standards Description:

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Standard(s) for Mathematical Practice:

MP1 Make sense of problems and persevere in solving them.

In Part A, students must start by understanding the meaning of the context and looking for an entry point to the solution. Throughout this problem, students must maintain the correspondence between their calculations/equations and the location of the coordinates in the graph of the hallway.

MP7 Look for and make use of structure.

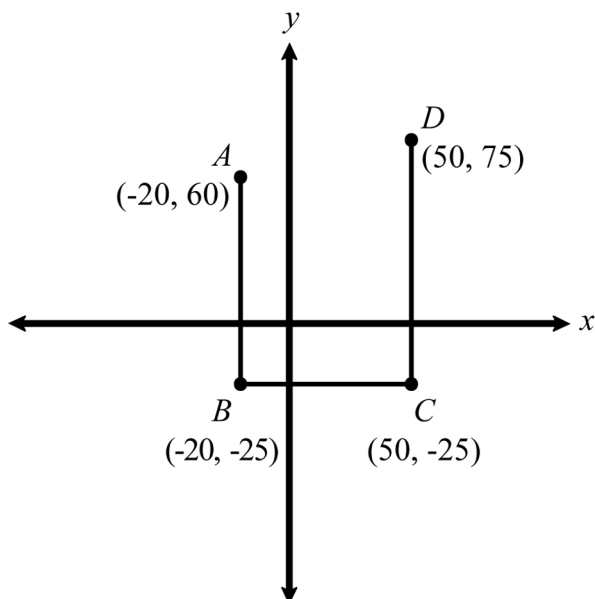
Throughout this problem, students must discern the structure of the coordinates of the graph of the hallway and use absolute value to find the distances between points with the same first coordinate or the same second coordinate.

6A
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Primary Standard: cc:6.NS.C.8

Points Possible: 3

There are three hallways at Wilson Middle School, as represented in the coordinate plane below. Four points are plotted on the coordinate plane to represent the end of each hallway.

**Part A**

Each unit represents 1 meter. What is the total length of the three hallways? Show or explain your work.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$\text{Line segment } AB = |60| + |-25| = 85$$

$$\text{Line segment } BC = |-20| + |50| = 70$$

$$\text{Line segment } CD = |-25| + |75| = 100$$

$$85 + 70 + 100 = 255 \text{ meters.}$$

**Evidence Statement(s):**

1. Student found the length of each hallway by adding the absolute values of appropriate x- and y-values.
2. Student calculated the total length of the three hallways.
3. Student showed or explained how they found the total length of the three hallways.

**Common Misconception(s):**

- Student may have found the distances between the points by calculating the difference in the absolute values of coordinate pairs with the same first coordinate or the same second coordinate.
- Student may have found the distances between the points by calculating the sum of the absolute values of coordinate pairs with different first coordinates or different second coordinates.

**6B**

Primary Standard: cc:6.NS.C.8

Points Possible: 1

**Part B**

The Wilson Middle School flagpole is 28 meters to the right of point  $D$ . Give the coordinates of the point that represents the location of the school's flagpole.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

$$50 + 28 = 78$$

(78, 75)

**Evidence Statement(s):**

1. Student reasoned that 28 units must be added to the x-coordinate of point  $D$ , and determined the coordinates of the flagpole.

**Common Misconception(s):**

- Student may have represented the flagpole as a location 28 meters away from point  $D$ , but to the left of or above/below point  $D$ , instead of to the right of point  $D$ .
- Student may have represented the flagpole as a location that is 28 meters to the right of a point other than point  $D$ .

**Item Id: i111942****Item Type: Multiple Select**

Standards Description:

6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

Primary Standard: cc:6.SP.A.1

Points Possible: 1

Which of the following questions are statistical questions?

Select **all** that apply.

A. Who is Peter's favorite athlete?

Student thought that a question with a categorical answer asked about one person was a statistical question; did not recognize that there is no variability.

B. How many pets does Theo have?

Student thought that a question with a numerical answer asked about one other person was a statistical question; did not recognize that there is no variability.

**C. How many hours per night did Lisa sleep last month?**

Correct.

**D. How many instruments does each member of the school band play?**

Correct.

**E. Who is the favorite music artist of each member of the football team?**

Correct.

8

Item Id: i112800

Item Type: Selected Response

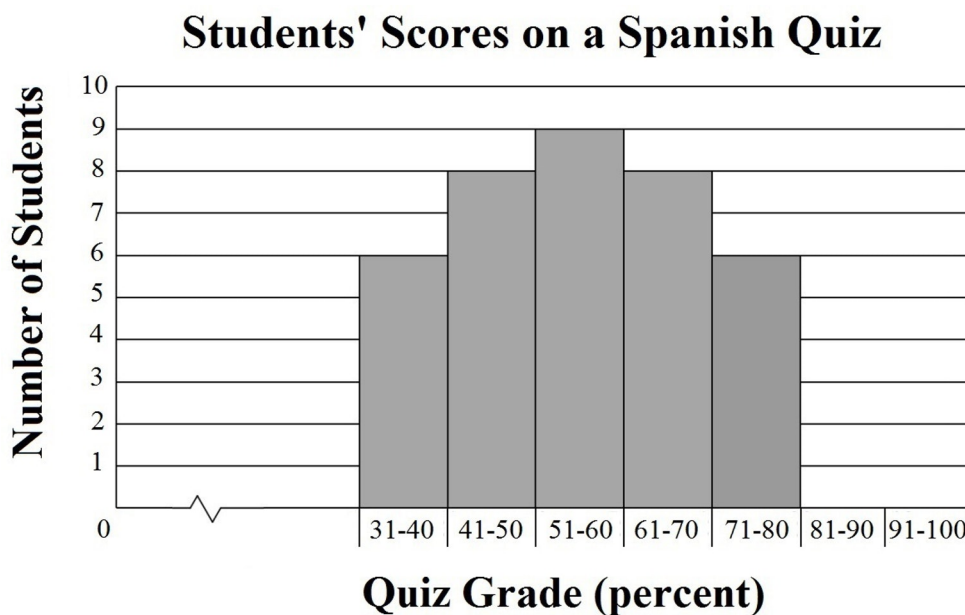
Standards Description:

6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Primary Standard: cc:6.SP.A.2

Points Possible: 1

A teacher made a histogram of the scores on a Spanish quiz.



Which statement about the histogram above is true?

**A. The distribution is symmetric because there is a vertical line of symmetry.** Correct.

B. The distribution is skewed right because the histogram is closer to the right side of the chart area. Student based skewness on the physical location of the data on the graph, not on the data itself.

C. The distribution is skewed left because the difference between 80 and 100 is less than the difference between 31 and 0.

Student based skewness on the location of the data on the x-axis rather than on where data points fall in relation to the whole data set.

D. The distribution is skewed right because the difference between 80 and 100 is less than the difference between 31 and 0.

Student based skewness on the location of the data on the x-axis rather than on where data points fall in relation to the whole data set and reversed the skewness.

**Item Id: i112187**

**Item Type: Selected Response**

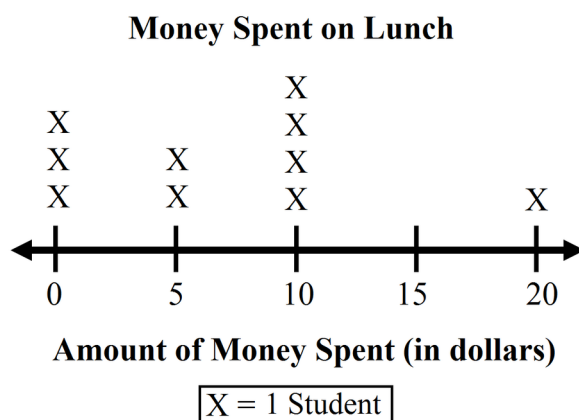
Standards Description:

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Primary Standard: cc:6.SP.B.4

Points Possible: 1

Bethany asked her classmates how much money they spent on lunch every week. She then made the line plot shown below from her data set of responses.



Which data set did Bethany use to make the line plot?

A. \$3, \$2, \$4, \$1

Student used the number of Xs over each value as the amount of money spent.

B. \$0, \$5, \$10, \$20

Student represented each number that had an X above it one time.

C. \$3, \$3, \$3, \$2, \$2, \$4, \$4, \$4, \$4, \$1

Student used the number of Xs over each value to represent each point in the data set.

**D.** \$0, \$0, \$0, \$5, \$5, \$10, \$10, \$10, \$10, \$20

**Correct.**



10

**Item Id: i112727****Item Type: Constructed Response**

Standards Description:

6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Standard(s) for Mathematical Practice:

MP3 Construct viable arguments and critique the reasoning of others.

Students need to respond to an argument, justify their conclusions, and communicate them to others.

MP6 Attend to precision.

Students need a strong understanding of statistical vocabulary and need to be able to use it appropriately.

Primary Standard: cc:6.SP.A.3

Points Possible: 2

Rickie played eight rounds of miniature golf in June and eight rounds of miniature golf in July. He recorded his score for each round.

Rickie's mother asked him if his scores varied more in June or July.

Rickie claims that a measure of center will answer his mother's question. Is Rickie's claim correct?

- If Rickie's claim is correct, explain why.
- If Rickie's claim is incorrect, state what type of measure he should use to answer his mother's question and explain why.

Respond in the space provided.

**Exemplar Student Response:**

*Equivalent answers and alternate explanations are also accepted. When prompted, answers may vary due to rounding or estimation.*

Rickie is incorrect. He should find a measure of variation to answer his mother's question. Since his mother is asking in which month the scores varied more, her question should be answered by comparing the spreads of the data distributions in June and July. A measure of variation will describe the spread of

the data distributions. The month that has the golf scores with the larger spread would be the month with the scores that vary more.

**Evidence Statement(s):**

1. Student determined that Rickie is incorrect and identified that he should find a measure of variation; may have identified interquartile range, mean absolute deviation, range, or spread as the type of measure Rickie should find.
2. Student justified their answer by demonstrating understanding that a measure of variation, not a measure of center, describes how values vary within a data set.

**Common Misconception(s):**

- Student did not recognize that a measure of center cannot answer a question about variation in a data set.
- Student thought that Rickie's average scores in June and July were being compared to each other, and therefore thought it appropriate to find a measure of center (such as the mean) to answer Rickie's mother's question.