

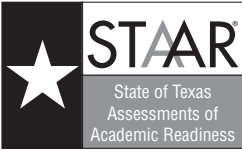
Texas STAAR 2018 Grade 6 Math

Reference Materials
Pages 2 - 5

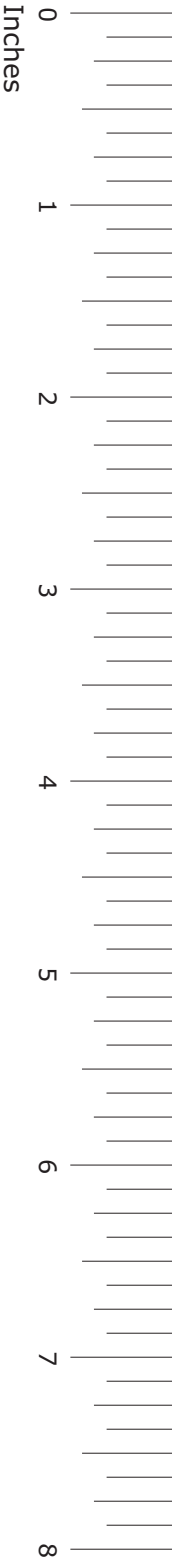
Exam Materials
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Answer Key Materials
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STAAR GRADE 6 MATHEMATICS REFERENCE MATERIALS



| AREA | | |
|----------------------------|--|-------------------------------|
| Triangle | | $A = \frac{1}{2}bh$ |
| Rectangle or parallelogram | | $A = bh$ |
| Trapezoid | | $A = \frac{1}{2}(b_1 + b_2)h$ |
| VOLUME | | |
| Rectangular prism | | $V = Bh$ |



STAAR GRADE 6 MATHEMATICS REFERENCE MATERIALS

LENGTH

Customary

1 mile (mi) = 1,760 yards (yd)

1 yard (yd) = 3 feet (ft)

1 foot (ft) = 12 inches (in.)

Metric

1 kilometer (km) = 1,000 meters (m)

1 meter (m) = 100 centimeters (cm)

1 centimeter (cm) = 10 millimeters (mm)

VOLUME AND CAPACITY

Customary

1 gallon (gal) = 4 quarts (qt)

1 quart (qt) = 2 pints (pt)

1 pint (pt) = 2 cups (c)

1 cup (c) = 8 fluid ounces (fl oz)

Metric

1 liter (L) = 1,000 milliliters (mL)

WEIGHT AND MASS

Customary

1 ton (T) = 2,000 pounds (lb)

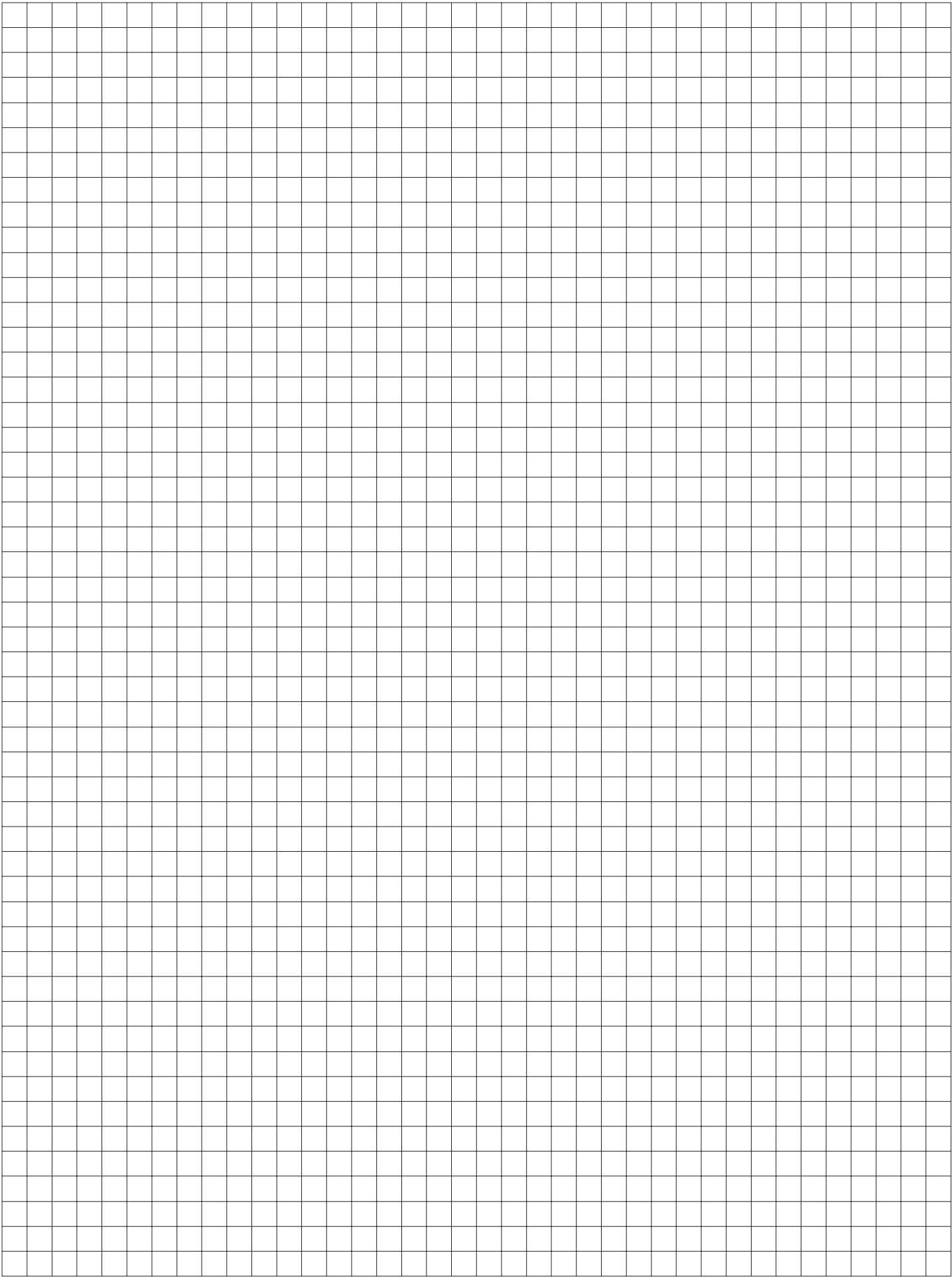
1 pound (lb) = 16 ounces (oz)

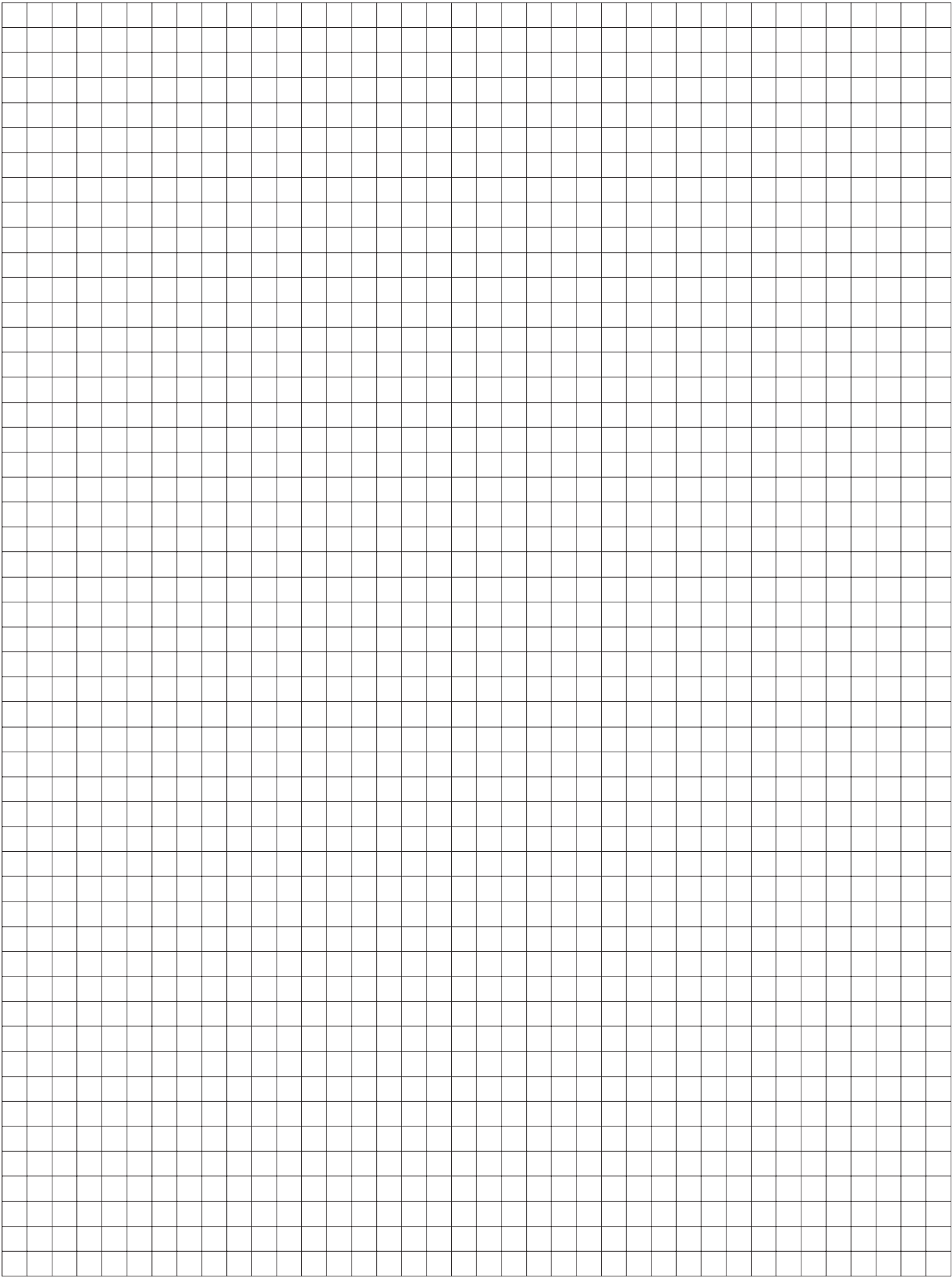
Metric

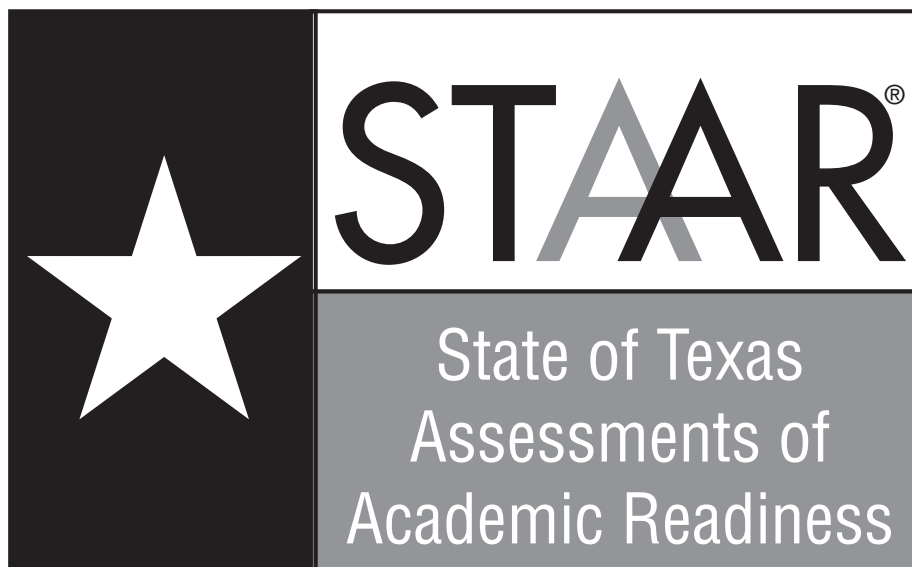
1 kilogram (kg) = 1,000 grams (g)

1 gram (g) = 1,000 milligrams (mg)

Centimeters







GRADE 6
Mathematics

Administered May 2018

RELEASED

DIRECTIONS

Read each question carefully. For a multiple-choice question, determine the best answer to the question from the four answer choices provided. For a griddable question, determine the best answer to the question. Then fill in the answer on your answer document.

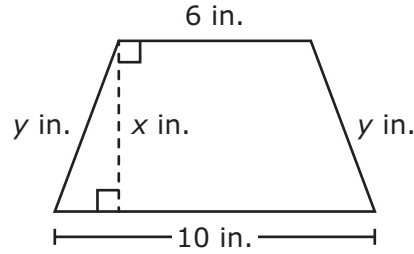
- 1 Serena bought 5 shirts for \$6 each and spent \$7 on lunch. She paid for the shirts and lunch using her debit card. The change in the balance of Serena's checking account can be represented by the expression shown.

$$5(-6) + (-7)$$

Which integer represents the change in the balance of Serena's checking account from these purchases?

- A -37
- B 23
- C -18
- D 4

- 2 The face of a lamp shade is shaped like a trapezoid. The dimensions of the face are shown in the diagram.



Which equation can be used to find A , the area of the face of the lamp shade in square inches?

- F** $A = \frac{1}{2}(6 + 10)y$
- G** $A = \frac{1}{2}(6 + 10)x$
- H** $A = \frac{1}{2}(6) + (10)x$
- J** $A = \frac{1}{2}(6) + (10)y$
-

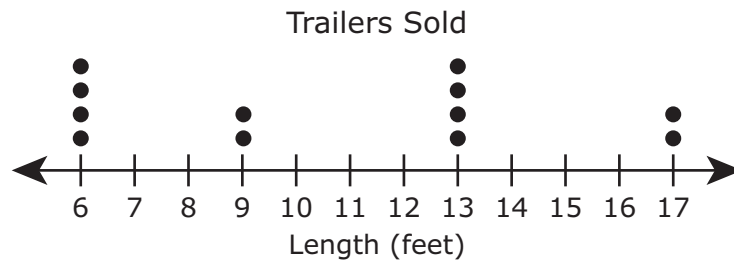
- 3 George wrote an integer. The opposite of George's integer is -53 .

Which of these statements about George's integer must be true?

- I. The integer is 53.
- II. The integer has an absolute value of -53 .
- III. The integer is -53 .
- IV. The integer has an absolute value of 53.

- A** I and II
- B** II and IV
- C** II and III
- D** I and IV

- 4 The dot plot shows the lengths of the 12 trailers sold at a store last month.



Which statement about the data is true?

- F** The interquartile range is 7, and the range is 17.
- G** The interquartile range is 7, and the range is 11.
- H** The interquartile range is 2.75, and the range is 17.
- J** The interquartile range is 2.75, and the range is 11.

- 5 A carpenter charges \$720 for 18 hours of work. She charges the same amount of money for each hour of work.

Which table shows the relationship between the amount of time the carpenter works and the amount of money she charges?

A Carpenter's Charges

| Amount of Time Worked (hours) | Amount Charged (dollars) |
|-------------------------------|--------------------------|
| 2 | 80 |
| 4 | 160 |
| 6 | 240 |
| 8 | 320 |

C Carpenter's Charges

| Amount of Time Worked (hours) | Amount Charged (dollars) |
|-------------------------------|--------------------------|
| 3 | 75 |
| 5 | 125 |
| 7 | 175 |
| 9 | 225 |

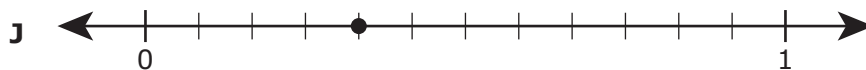
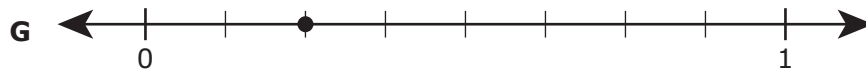
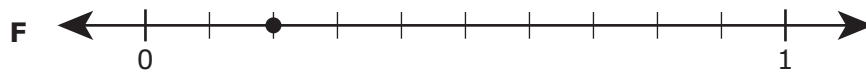
B Carpenter's Charges

| Amount of Time Worked (hours) | Amount Charged (dollars) |
|-------------------------------|--------------------------|
| 19 | 720 |
| 20 | 738 |
| 21 | 756 |
| 22 | 774 |

D Carpenter's Charges

| Amount of Time Worked (hours) | Amount Charged (dollars) |
|-------------------------------|--------------------------|
| 14 | 720 |
| 15 | 720 |
| 16 | 720 |
| 17 | 720 |

- 6 An engine is operating at 25% of its full power. Which number line shows a point that represents 25%?



-
- 7 A can contains 24 fluid ounces of fruit juice. How many pints of fruit juice does the can contain?

- A** 12 pt
B 3 pt
C $1\frac{1}{2}$ pt
D $\frac{1}{3}$ pt

-
- 8 Shea wrote the expression $5(y + 2) + 4$ to show the amount of money five friends paid for snacks at a baseball game. Which expression is equivalent to the one Shea wrote?

- F** $5 + y + 5 + 2 + 4$
G $5 \cdot y \cdot 5 \cdot 2 + 4$
H $5 \cdot y \cdot 4 + 5 \cdot 2 \cdot 4$
J $5 \cdot y + 5 \cdot 2 + 4$

- 9 The table shows the approximate median annual salaries associated with two levels of education.

| Median Annual Salaries | | |
|--------------------------------|-------------------|-----------------|
| Level of Education | Bachelor's degree | Master's degree |
| Median Annual Salary (dollars) | 57,600 | 69,100 |

Based on the data in the table, how much more money would a person with a master's degree earn than a person with a bachelor's degree over a 35-year career?

- A \$402,500
- B \$126,770
- C \$11,500
- D \$4,434,500

-
- 10 A waiter earned a 17% tip. What decimal is equivalent to 17%?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

-
- 11 Yesterday 170 guests at a hotel called for room service, and 255 guests did not call for room service. What percentage of the guests at this hotel called for room service yesterday?
- A 60%
 - B 15%
 - C 40%
 - D 85%

12 Which expression is equivalent to $16 + 2 \cdot 36$?

F $2^4 + 2^3 \cdot 3^2$

G $2^3 + 2^3 \cdot 3^2$

H $2^4 + 2^2 \cdot 3^2$

J $2^3 + 2^2 \cdot 3^3$

13 Alejandra has \$600 in her checking account. She wants to spend part of this money on a computer. She wants to have at least \$250 left in her checking account after buying the computer. The inequality shown can be used to find t , the amount of money in dollars that Alejandra can spend on the computer.

$$t + 250 \leq 600$$

Which inequality represents all possible values of t ?

A $t \geq 350$

B $t \leq 850$

C $t \leq 350$

D $t \geq 850$

- 14** The table shows the portion of a day four students used to build a website.

Time Used

| Student | Portion of Day |
|---------|----------------|
| Jamail | 29.4% |
| Andrew | 37.6% |
| Ernesto | $\frac{7}{25}$ |
| Blake | $\frac{3}{10}$ |

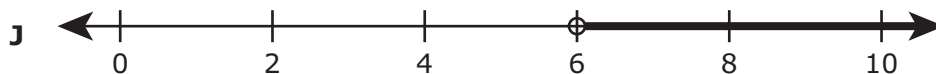
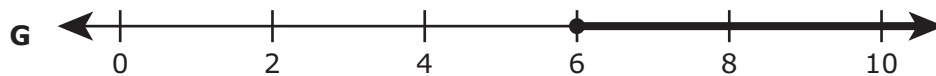
Which list shows the students in order from the greatest amount of time used to the least amount of time used?

- F** Andrew, Blake, Jamail, Ernesto
- G** Blake, Andrew, Jamail, Ernesto
- H** Ernesto, Blake, Andrew, Jamail
- J** Andrew, Jamail, Ernesto, Blake

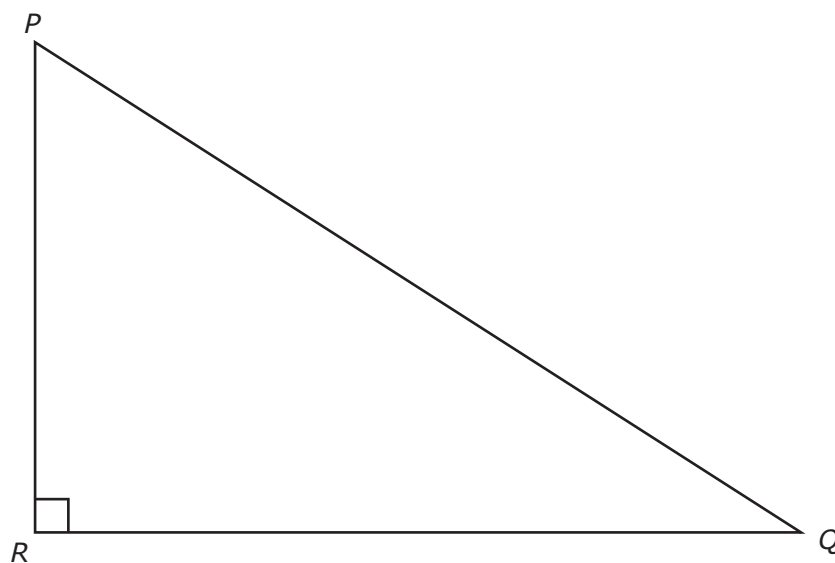
-
- 15** Consumers sometimes make choices that cause negative information to be put on their credit reports. Which of these is the most likely number of years that this negative information will remain on their credit reports?

- A** 3 to 6 years
- B** 7 to 10 years
- C** 11 to 14 years
- D** 15 to 18 years

16 Which number line represents the solution to $5x < 30$?



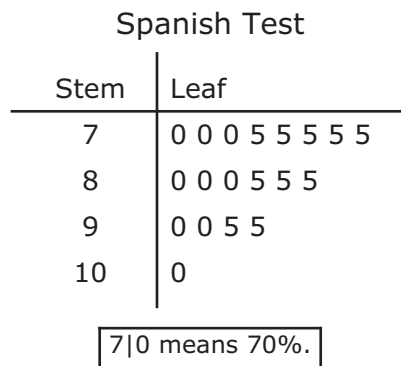
- 17** Triangle PQR is shown. Use the ruler provided to measure the dimensions of the triangle to the nearest $\frac{1}{2}$ inch.



Which measurement is closest to the area of triangle PQR in square inches?

- A** 5 in.^2
- B** $8\frac{3}{4} \text{ in.}^2$
- C** $6\frac{1}{2} \text{ in.}^2$
- D** 11 in.^2
-
- 18** A pharmacist put 4.536 ounces of vitamin pills into bottles. She put 0.042 ounce of vitamin pills into each bottle.
- How many bottles did the pharmacist use for these vitamin pills?
- F** 11
- G** 5
- H** 18
- J** 108

- 19** The stem and leaf plot shows the percentage of questions on a Spanish test that were answered correctly by each student in a class.



Which statement is true?

- A** Nine students answered 55% of the questions correctly.
 - B** Half the students answered 70% or 75% of the questions correctly.
 - C** Eight students answered more than 80% of the questions correctly.
 - D** Ten students answered 100% of the questions correctly.
-
- 20** The table shows the time Monique worked and the amount of money she earned during four different weeks.

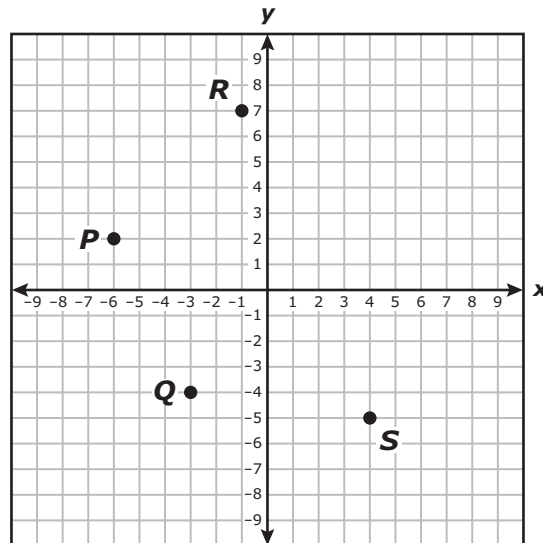
Monique's Earnings

| Time Worked (hours) | Amount Earned (dollars) |
|---------------------|-------------------------|
| 15 | 123.75 |
| 20 | 165 |
| 24 | 198 |
| 30 | 247.50 |

Based on the information in the table, how much will Monique earn if she works 40 hours in a week?

- F** \$330
- G** \$255.75
- H** \$297
- J** \$82.50

- 21** The coordinate grid shows points P , Q , R , and S . All the coordinates for these points are integers.



What is the value of the x-coordinate of point P ?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

-
- 22** Which equation has a solution of $k = 6.5$?

- F** $-3k = 19.5$
- G** $-1 + k = 7.5$
- H** $-7k = -45.5$
- J** $-2 + k = -8.5$

23 Dolores spent \$13.00 of the \$20.00 in her wallet. Which decimal represents the fraction of the \$20.00 Dolores spent?

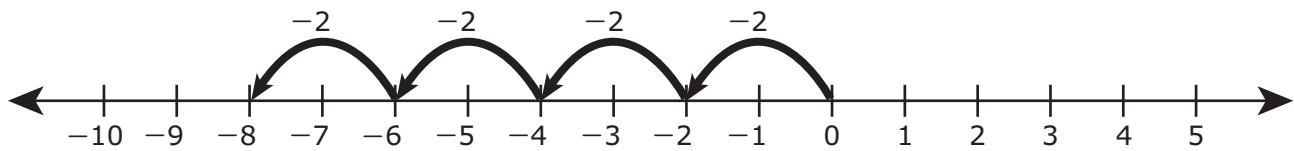
A 0.35

B 0.13

C 0.07

D 0.65

24 Which expression is represented on the number line?



F $0 - (-8)$

G $-2 \cdot 4$

H $-2 + (-8)$

J $-2 \div 4$

25 Which set of angle measures CANNOT be the angle measures of a triangle?

- A** 60° , 60° , 61°
 - B** 1° , 1° , 178°
 - C** 13.9° , 16.1° , 150°
 - D** 59° , 60° , 61°
-

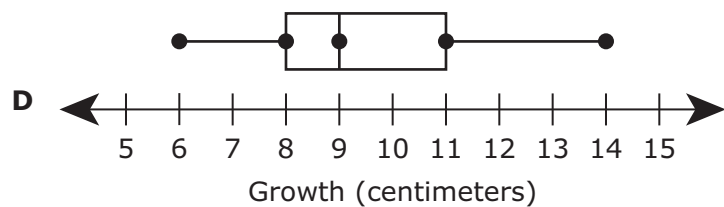
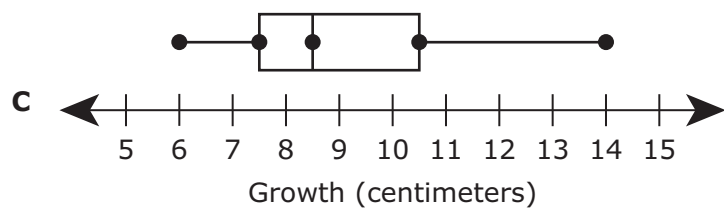
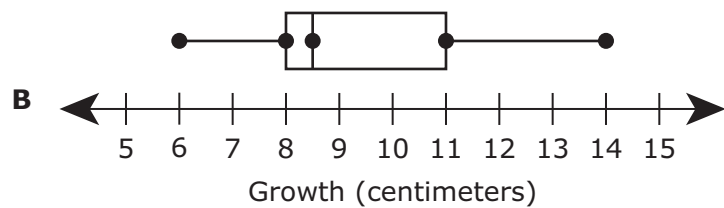
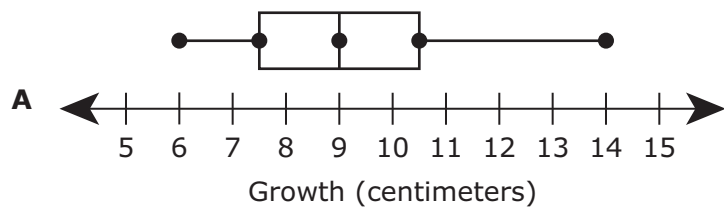
26 Which situation can be represented by $17.35x > 624.60$?

- F** A waitress had received a \$17.35 tip. This brought her total in tips to more than \$624.60. How much money in tips did she have before the \$17.35 tip?
- G** Brianda made a deposit of \$17.35 into a savings account. This brought the total in her savings account to \$624.60. How much money did she have in this savings account before she made the deposit?
- H** A dozen tamales cost \$17.35 including tax. How many dozen tamales can a customer buy with \$624.60?
- J** Darren earns \$17.35 per hour at his job. How many hours does he need to work in order to earn more than \$624.60?

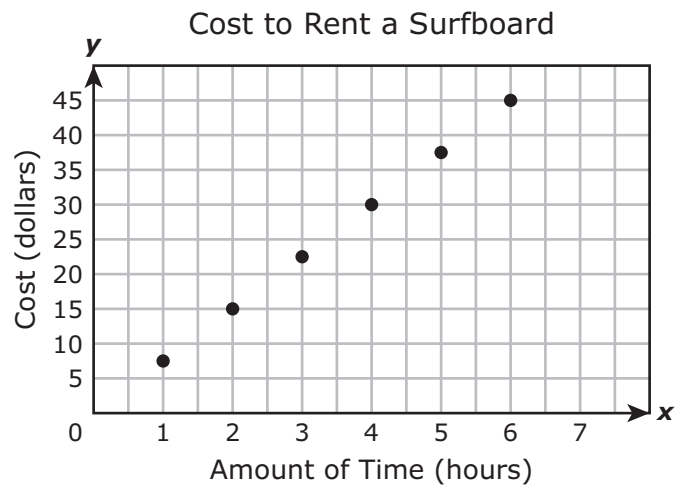
27 The list shows the growth in centimeters of 12 plants during one week.

6, 7, 7, 8, 8, 8, 9, 9, 10, 11, 11, 14

Which box plot best displays a summary of these data?



- 28** The graph shows the cost to rent a surfboard for different amounts of time.



Which list best represents the independent values of the graphed points?

- F** 1, 7.50, 2, 15, 3, 22.50, 4, 30, 5, 37.50, 6, 45
- G** 5, 10, 15, 20, 25, 30, 35, 40, 45
- H** 7.50, 15, 22.50, 30, 37.50, 45
- J** 1, 2, 3, 4, 5, 6

- 29** Patricia recorded the prices of watches at a store. The prices are shown in the table.

Watches

| Price (dollars) |
|--------------------|
| 15 |
| 22 |
| 16 |
| 24 |
| 16 |
| 20 |
| 12 |
| 27 |

What is the median price of the watches in dollars?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

-
- 30** Which list shows the numbers in order from least value to greatest value?

F $-\frac{2}{5}$ -2.47 $-2\frac{1}{2}$ 5 $\frac{21}{4}$

G $-\frac{2}{5}$ -2.47 $-2\frac{1}{2}$ $\frac{21}{4}$ 5

H $-2\frac{1}{2}$ -2.47 $-\frac{2}{5}$ 5 $\frac{21}{4}$

J $-2\frac{1}{2}$ -2.47 $-\frac{2}{5}$ $\frac{21}{4}$ 5

- 31** A shop owner offered a 20% discount off the regular price of a mirror. The amount of the discount is \$3.

What is the regular price of the mirror?

- A** \$15
 - B** \$6
 - C** \$9
 - D** \$18
-

- 32** Keith wrote the expression shown to determine the cost in dollars for an upcoming trip.

$$(127.50 - 23.50) + 3(86.50 + 4)$$

Which expression is equivalent to the one Keith wrote?

- F** $107(90.50)$
 - G** $101(90.50)$
 - H** $104 + 3(90.50)$
 - J** $104 + 263.50$
-

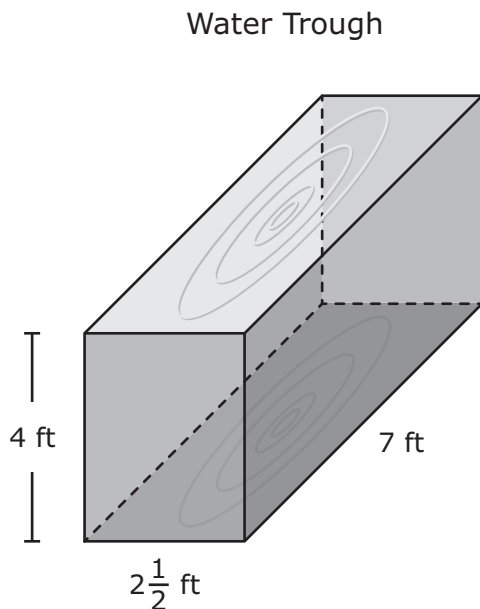
- 33** LuAnn is playing a math game. She chooses three cards. The value of each of her cards is shown.

- First card: -12
- Second card: 3
- Third card: -5

What is the sum of the values of LuAnn's three cards?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

- 34** The figure represents a water trough in the shape of a rectangular prism. The dimensions of the water trough are given in feet.



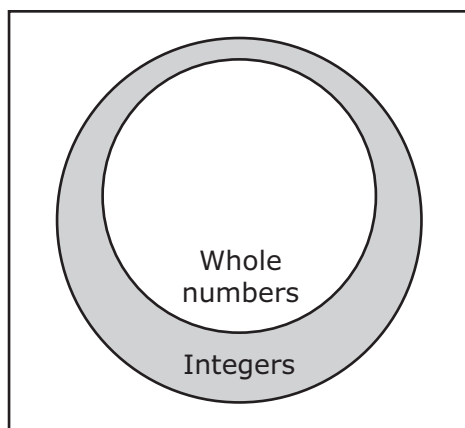
What is the volume of water in the trough in cubic feet when the trough is full?

- F** $21\frac{1}{2}$ ft³
- G** $13\frac{1}{2}$ ft³
- H** 70 ft³
- J** 76 ft³

-
- 35** Which situation can be represented by the equation $y = 74x$?

- A** A company uses a total of y gallons of water at a rate of 74 gallons per hour for x hours.
- B** A restaurant serves a total of y meals in one day, in which 74 meals are served during the first hour and x meals are served during the remaining hours.
- C** A company manufactures a total of 74 drinking glasses every hour, with x of the glasses made of clear glass and y of them made of blue glass.
- D** A restaurant prepares a total of y batches of pizza sauce from 74 pounds of tomatoes, with each batch weighing x pounds.

- 36** The Venn diagram shows the relationships among different sets of numbers.



Which number would be located in the shaded part of the diagram?

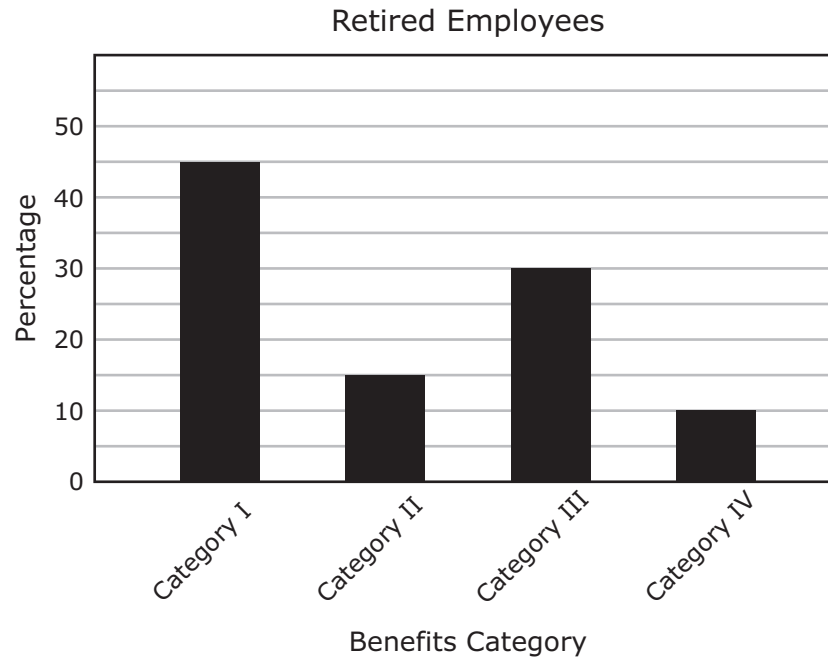
F -1.7

G -8

H $\frac{2}{3}$

J 10

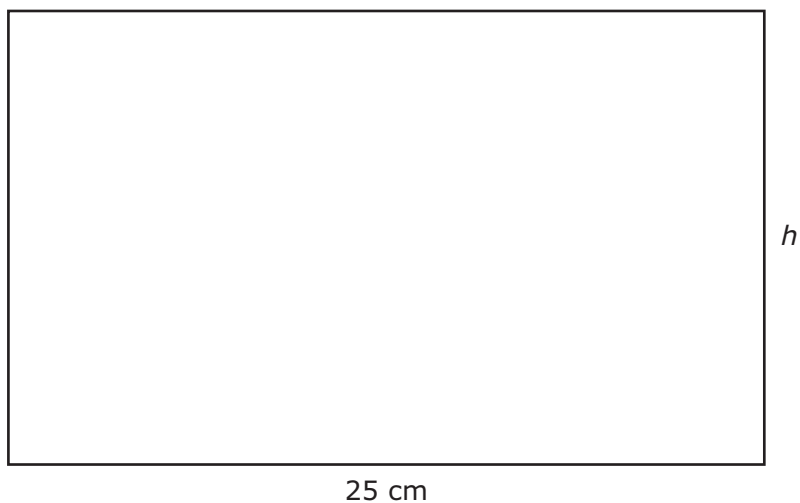
- 37** Employees who have retired from a company are placed in different benefit categories. The bar graph shows the percentages of the retired employees in different benefit categories.



Which statement about the employees is supported by the data in the bar graph?

- A** More than half the employees are in Category I.
- B** The number of employees in Category II is twice the number of employees in Category III.
- C** The number of employees in Category II or Category III is greater than the number of employees in Category I.
- D** The number of employees in Category I is three times the number of employees in Category II.

- 38** The area of the rectangle shown is 375 square centimeters.



What is h , the height of the rectangle in centimeters?

- F** 350 cm
- G** 7.5 cm
- H** 15 cm
- J** 162.5 cm

| Item Number | Reporting Category | Readiness or Supporting | Content Student Expectation | Correct Answer |
|-------------|--------------------|-------------------------|-----------------------------|----------------|
| 1 | 2 | Readiness | 6.3(D) | A |
| 2 | 3 | Supporting | 6.8(C) | G |
| 3 | 1 | Supporting | 6.2(B) | D |
| 4 | 4 | Readiness | 6.12(C) | G |
| 5 | 2 | Readiness | 6.6(C) | A |
| 6 | 1 | Supporting | 6.4(F) | G |
| 7 | 3 | Readiness | 6.4(H) | C |
| 8 | 1 | Readiness | 6.7(D) | J |
| 9 | 4 | Supporting | 6.14(H) | A |
| 10 | 1 | Readiness | 6.4(G) | 0.17 |
| 11 | 2 | Readiness | 6.5(B) | C |
| 12 | 1 | Readiness | 6.7(A) | F |
| 13 | 2 | Readiness | 6.10(A) | C |
| 14 | 1 | Readiness | 6.2(D) | F |
| 15 | 4 | Supporting | 6.14(E) | B |
| 16 | 2 | Supporting | 6.9(B) | H |
| 17 | 3 | Readiness | 6.8(D) | A |
| 18 | 2 | Readiness | 6.3(E) | J |
| 19 | 4 | Readiness | 6.13(A) | C |
| 20 | 2 | Readiness | 6.4(B) | F |
| 21 | 3 | Readiness | 6.11(A) | -6 |
| 22 | 2 | Supporting | 6.10(B) | H |
| 23 | 1 | Readiness | 6.4(G) | D |
| 24 | 2 | Supporting | 6.3(C) | G |
| 25 | 3 | Supporting | 6.8(A) | A |
| 26 | 2 | Supporting | 6.9(C) | J |
| 27 | 4 | Supporting | 6.12(A) | C |
| 28 | 2 | Supporting | 6.6(A) | J |
| 29 | 4 | Readiness | 6.12(C) | 18 |
| 30 | 1 | Readiness | 6.2(D) | H |
| 31 | 2 | Readiness | 6.5(B) | A |
| 32 | 1 | Readiness | 6.7(A) | H |
| 33 | 2 | Readiness | 6.3(D) | -14 |
| 34 | 3 | Readiness | 6.8(D) | H |
| 35 | 2 | Readiness | 6.6(C) | A |
| 36 | 1 | Supporting | 6.2(A) | G |
| 37 | 4 | Readiness | 6.12(D) | D |
| 38 | 2 | Readiness | 6.10(A) | H |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|---|
| 1 | Option A is correct | To determine the integer (positive and negative numbers with no fractional or decimal part, and zero) that represents the change in the balance of Serena's checking account (-37), the student should have first multiplied 5 by -6 , and then added the result of -30 to -7 . |
| | Option B is incorrect | The student likely made a sign error when multiplying 5 by -6 , resulting in 30, and then correctly added -7 to 30. The student needs to focus on understanding the rules for multiplying integers. |
| | Option C is incorrect | The student likely added 5 to -6 with an incorrect result of -11 , and then added -7 . The student needs to focus on recognizing multiplication in a mathematical expression and understanding the rules for adding integers. |
| | Option D is incorrect | The student likely added 5 to -6 with an incorrect result of 11, and then added -7 . The student needs to focus on recognizing multiplication in a mathematical expression and understanding the rules for adding integers. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 2 | Option G is correct | <p>To determine the equation that can be used to find A, the area (amount of space covered by a surface) of the face of the lamp shade in square inches, the student should have identified 6 and 10 as the lengths in inches of the two bases (parallel sides) of the trapezoid and x as the height (vertical distance from top to bottom) in inches of the trapezoid, and then identified $A = \frac{1}{2}(6 + 10)x$ as the equation that includes these quantities correctly in the formula for the area of a trapezoid</p> $(A = \frac{1}{2}(b_1 + b_2)h).$ |
| | Option F is incorrect | <p>The student likely identified the correct quantities for the two bases of the trapezoid, but incorrectly identified y as the height of the trapezoid. The student needs to focus on understanding that the height of a trapezoid is a segment that is perpendicular to both of the bases (meets both of the bases at 90° angles).</p> |
| | Option H is incorrect | <p>The student likely identified the correct quantities for the two bases and the height of the trapezoid, but did not recognize that the parentheses in the equation were placed incorrectly. The student needs to focus on recognizing the correct form for the formula for the area of a trapezoid.</p> |
| | Option J is incorrect | <p>The student likely identified the correct quantities for the two bases of the trapezoid, but incorrectly identified y as the height of the trapezoid and did not recognize that the parentheses in the equation were placed incorrectly. The student needs to focus on recognizing the correct form for the formula for the area of a trapezoid and understanding that the height of a trapezoid is a segment that is perpendicular to both of the bases (meets both of the bases at 90° angles).</p> |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 3 | Option D is correct | To determine which statements about George's integer (positive and negative numbers with no fractional or decimal part, and zero) must be true, the student should have understood that if the opposite (number that is the same distance from zero but in the opposite direction) of George's integer is -53 , then the integer is 53 , and if the integer is 53 , then the integer has an absolute value (distance from zero on the number line) of 53 . |
| | Option A is incorrect | The student likely identified the value of the integer, but did not know how to determine the absolute value of an integer. The student needs to focus on understanding the concept of absolute value. |
| | Option B is incorrect | The student likely did not understand that an integer cannot have two absolute values. The student needs to focus on understanding the concept of absolute value. |
| | Option C is incorrect | The student likely did not understand how to determine the opposite of an integer or the absolute value of an integer. The student needs to focus on understanding the concepts of opposite and absolute value. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 4 | Option G is correct | To determine which statement about the data is true, the student should have calculated the interquartile range (difference between the upper quartile and lower quartile of the data set) and the range (difference between the greatest (largest) value and least (smallest) value in the data set) of the data. The dot plot shows 12 data points, so the lower quartile would be the value halfway between the third least and fourth least data points, and the upper quartile would be the value halfway between the third greatest and fourth greatest data points. Since the value of the third least data point is 6 and the value of the fourth least data point is also 6, the value of the lower quartile would also be 6. Since the value of the third greatest data point is 13 and the value of the fourth greatest data point is also 13, the value of the upper quartile would be 13. The interquartile range of the data is represented by $13 - 6$, so the interquartile range of the data is 7. The greatest value in the data set is 17 and the least value in the data set is 6, so the range of the data is represented by $17 - 6$, and therefore the range of the data is 11. |
| | Option F is incorrect | The student likely calculated the correct value for the interquartile range of the data set, but incorrectly identified the greatest value of the data set (17) as the range. The student needs to focus on understanding how to calculate the range of a data set. |
| | Option H is incorrect | The student likely calculated the value of the interquartile range of the data set as one-fourth of the difference between the greatest value in the data set and the least value in the data set ($\frac{1}{4}(17 - 6)$), and incorrectly identified the greatest value of the data set (17) as the range. The student needs to focus on understanding how to calculate the interquartile range of a data set and the range of a data set. |
| | Option J is incorrect | The student likely calculated the value of the interquartile range of the data set as one-fourth of the difference between the greatest value in the data set and the least value in the data set ($\frac{1}{4}(17 - 6)$), and calculated the correct value for the range of the data set. The student needs to focus on understanding how to calculate the interquartile range of a data set. |

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| Item# | Rationale | |
|-------|-----------------------|---|
| 5 | Option A is correct | To determine the table that shows the relationship between the amount of time the carpenter works and the amount of money she charges, the student should have first divided \$720 by 18 to determine that the carpenter charges \$40 for each hour of work, and then determined that each amount charged in the second column of the table is 40 times the corresponding (paired) number of hours worked in the first column of the table. |
| | Option B is incorrect | The student likely identified a table where the initial amount charged was \$720 and the change in the amount charged was 18 for each hour worked. The student needs to focus on understanding the concept of a unit rate (charge per hour worked). |
| | Option C is incorrect | The student likely divided 18 by 720, resulting in 0.025, thought this meant the carpenter charged \$25 for each hour of work, and identified a table of values that represented this hourly rate. The student needs to focus on calculating the unit rate (charge per hour worked) by dividing a y -value by its corresponding x -value. |
| | Option D is incorrect | The student likely did not understand that the amount charged depends on the number of hours worked and identified a table of values where the amount charged is always \$720. The student needs to focus on understanding the concept of a unit rate (charge per hour worked). |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 6 | Option G is correct | To determine the number line that shows a point that represents 25%, the student should have converted 25% to a fraction by interpreting the word “percent” as meaning “per hundred.” Since 25 per hundred would be written as $\frac{25}{100}$, and since this fraction reduces to $\frac{1}{4}$, the point on this number line represents 25% because the point is located $\frac{2}{8}$ of the way from 0 to 1, and $\frac{2}{8}$ also reduces to $\frac{1}{4}$. |
| | Option F is incorrect | The student likely counted the number of intervals between 0 and the point and counted the number of intervals between the point and 1 and used these values as the numerator (top number) and denominator (bottom number) of the fraction, resulting in $\frac{2}{8}$. The student needs to focus on understanding that the denominator of a fraction represents the total number of parts in the whole. |
| | Option H is incorrect | The student likely counted the number of intervals between 0 and the point and counted the number of intervals between 0 and 1 and thought that $\frac{2}{5}$ was equivalent to 25%. The student needs to focus on understanding how to convert a fraction to an equivalent percent. |
| | Option J is incorrect | The student likely represented 25% as $\frac{25}{75}$, thinking that the 100 in the denominator (bottom number) should be decreased by the 25 in the numerator (top number) and identified a number line with a point that represented $\frac{4}{12}$, which is equivalent to $\frac{25}{75}$. The student needs to focus on understanding how to convert a percent to an equivalent fraction. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 7 | Option C is correct | To determine the number of pints equivalent to 24 fluid ounces, the student should have first converted 24 fluid ounces to cups by dividing 24 by 8 (1 cup = 8 fluid ounces,) and then converted the number of cups (3) to pints by dividing 3 by 2 (1 pint = 2 cups,) resulting in $1\frac{1}{2}$ cups. |
| | Option A is incorrect | The student likely divided the number of fluid ounces (24) by the number of cups in a pint (2). The student needs to focus on understanding how to convert between units within a measurement system when more than one conversion is needed. |
| | Option B is incorrect | The student likely divided the number of fluid ounces (24) by the number of fluid ounces in a cup (8), but did not convert the number of cups to pints. The student needs to focus on understanding how to convert between units within a measurement system when more than one conversion is needed. |
| | Option D is incorrect | The student likely divided 8 by 24 instead of dividing 24 by 8, and did not convert the number of cups to pints. The student needs to focus on understanding how to use proportions to convert between units within a measurement system and how to convert between units within a measurement system when more than one conversion is needed. |

2018 STAAR Grade 6 Mathematics Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 8 | Option J is correct | To determine which expression is equivalent to $5(y + 2) + 4$, the student should have applied the distributive property ($a(b + c) = ab + ac$) to the quantity $5(y + 2)$, resulting in $5 \cdot y + 5 \cdot 2$, and then added 4 to result in $5 \cdot y + 5 \cdot 2 + 4$. |
| | Option F is incorrect | The student likely added instead of multiplying when applying the distributive property to the quantity $5(y + 2)$. The student needs to focus on recognizing the operation of multiplication in an expression. |
| | Option G is incorrect | The student likely multiplied instead of adding when applying the distributive property to the quantity $5(y + 2)$. The student needs to focus on correctly applying the distributive property when simplifying an expression. |
| | Option H is incorrect | The student likely applied the distributive property correctly to the quantity $5(y + 2)$, but multiplied the 4 by each term instead of adding it to the result. The student needs to focus on understanding which quantities are affected when the distributive property is applied. |
| 9 | Option A is correct | To determine how much more money a person with a master's degree would earn than a person with a bachelor's degree over a 35-year career (\$402,500), the student could have first subtracted the salaries (\$69,100 – \$57,600), and then multiplied the result (\$11,500) by 35. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
| | Option B is incorrect | The student likely multiplied 35 by 2 and then added both salaries to the result. The student needs to focus on understanding how to decode a verbal situation and solve the problem it represents. |
| | Option C is incorrect | The student likely subtracted the two given salaries. The student needs to focus on understanding how to decode a verbal situation and solve the problem it represents. |
| | Option D is incorrect | The student likely added the two given salaries and multiplied the result by 35. The student needs to focus on understanding how to decode a verbal situation and solve the problem it represents. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|--|---|
| 10 | 0.17 and any equivalent values are correct | To determine the decimal that is equivalent to 17%, the student should have interpreted the word "percent" as "per hundred," which results in the fraction $\frac{17}{100}$. To convert the fraction to decimal form, the student should have divided 17 by 100, resulting in 0.17. |
| 11 | Option C is correct | To determine the percentage of the guests at the hotel who called for room service yesterday (40%), the student should have divided the number of guests who called for room service (170) by the total number of guests at the hotel (number of guests who called for room service plus number of guests who did not, which is represented by $170 + 255$), resulting in 0.4, and then converted the decimal to a percentage by multiplying by 100. |
| | Option A is incorrect | The student likely calculated the percentage of guests at the hotel who did not call for room service by dividing 255 by the total number of guests at the hotel ($170 + 255$) and converted the resulting decimal (0.6) to a percentage by multiplying by 100. The student needs to focus on understanding how to use given information to answer a question. |
| | Option B is incorrect | The student likely divided 255 by 170 and misinterpreted the quotient (answer to a division problem) of 1.5 as 15%. The student needs to focus on how to calculate what percentage of the total a given quantity represents. |
| | Option D is incorrect | The student likely divided 255 by 170, misrepresented the quotient (answer to a division problem) of 1.5 as 15%, and subtracted 15% from 100%. The student needs to focus on how to calculate what percentage of the total a given quantity represents, and how to use given information to answer a question. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|---|
| 12 | Option F is correct | To determine which expression is equivalent to $16 + 2 \cdot 36$, the student should have determined the prime factorization (an expression that shows a number written as a product of its prime factors) of 16, which is $2 \cdot 2 \cdot 2 \cdot 2$, or 2^4 , and the prime factorization of 36, which is $2 \cdot 2 \cdot 3 \cdot 3$, and then multiplied it by 2, resulting in $2^3 \cdot 3^2$, and recognized that $16 + 2 \cdot 36$ is equivalent to $2^4 + 2^3 \cdot 3^2$. |
| | Option G is incorrect | The student likely determined the correct prime factorization for $2 \cdot 3$, but made an error in determining the prime factorization of 16. The student needs to focus on how to determine the prime factorization of a number. |
| | Option H is incorrect | The student likely determined the correct prime factorizations for 16 and 36, but did not account for the factor of 2 in the original expression. The student needs to focus on making sure all factors are accounted for when determining the factors of the parts of a mathematical expression. |
| | Option J is incorrect | The student likely made errors when determining the prime factorization of 16 and the prime factorization of 36. The student needs to focus on how to determine the prime factorization of a number. |
| 13 | Option C is correct | To determine which inequality represents all possible values of t , the student should have subtracted 250 from both sides of the given inequality, resulting in $t \leq 350$. |
| | Option A is incorrect | The student likely subtracted 250 from both sides of the inequality, but reversed the direction of the inequality symbol. The student needs to focus on how to solve a one-step inequality. |
| | Option B is incorrect | The student likely added 250 to both sides of the inequality. The student needs to focus on how to solve a one-step inequality. |
| | Option D is incorrect | The student likely added 250 to both sides of the inequality and reversed the direction of the inequality symbol. The student needs to focus on how to solve a one-step inequality. |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 14 | Option F is correct | <p>To determine the list that shows the students in order from the greatest (largest) amount of time used to the least (smallest) amount of time used, the student should have converted the values listed in the table to the same type of number. The fraction $\frac{7}{25}$ written as a percent would be $\frac{7}{25} \cdot \frac{4}{4} = \frac{28}{100}$, or 28%, and the fraction $\frac{3}{10}$ written as a percent would be $\frac{3}{10} \cdot \frac{10}{10} = \frac{30}{100}$, or 30%. The percentages, written in order from greatest to least, would be 37.6%, 30%, 29.4%, and 28%, so the correct order of the students is Andrew, Blake, Jamail, Ernesto.</p> |
| | Option G is incorrect | <p>The student likely converted $\frac{7}{25}$ to a percent correctly, but converted $\frac{3}{10}$ to a percent incorrectly by dividing 10 by 3 and multiplying the result by 100, resulting in $333\frac{1}{3}\%$. The student needs to focus on understanding how to convert a fraction to a percent.</p> |
| | Option H is incorrect | <p>The student likely converted both fractions to percents incorrectly by dividing the denominator (bottom number) by the numerator (top number) and multiplying the result by 100 ($25 \div 7 \cdot 100 \approx 357.14\%$ and $10 \div 3 \cdot 100 \approx 333.33\%$). The student needs to focus on understanding how to convert a fraction to a percent.</p> |
| | Option J is incorrect | <p>The student likely only considered the numerator (top number) when comparing $\frac{7}{25}$ and $\frac{3}{10}$ to the percents in the table. The student needs to focus on understanding how to convert a fraction to a percent.</p> |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 15 | Option B is correct | The student should have recalled that negative information typically remains on a credit report from 7 to 10 years. |
| | Option A is incorrect | The student likely did not know the number of years negative information typically remains on a credit report. The student needs to focus on understanding how long negative information typically remains on a credit report. |
| | Option C is incorrect | The student likely did not know the number of years negative information typically remains on a credit report. The student needs to focus on understanding how long negative information typically remains on a credit report. |
| | Option D is incorrect | The student likely did not know the number of years negative information typically remains on a credit report. The student needs to focus on understanding how long negative information typically remains on a credit report. |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 16 | Option H is correct | To determine which number line represents the solution to $5x < 3$, the student should have first divided both sides of the inequality by 5, resulting in $x < 6$, or all values less than 6. The student should have chosen the number line that shows all numbers less than 6 (numbers to the left of 6, not including the 6, which is indicated by an unshaded circle.) |
| | Option F is incorrect | The student likely solved the inequality correctly but identified a number line that included the number 6 in the solution. This number line represents x is less than or equal to 6, or $x \leq 6$. The student needs to focus on understanding the difference between a shaded circle and an unshaded circle on a number line. |
| | Option G is incorrect | The student likely divided both sides of the inequality by 5, but reversed the direction of the inequality symbol, resulting in $x > 6$. The student then likely selected the number line showing numbers greater than 6, but selected the number line with a shaded circle. The student needs to focus on understanding how to solve one-step inequalities and how to represent the solution on a number line. |
| | Option J is incorrect | The student likely identified a number line with the arrow pointing in the wrong direction. The student needs to focus on understanding that a graph with an arrow pointing to the right represents the solution to an inequality in which the variable (symbol used to represent an unknown number) is greater than a specific value. |

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| Item# | Rationale | |
|-------|-----------------------|---|
| 17 | Option A is correct | To determine the area (amount of space covered by a surface) of triangle PQR in square inches, the student should have measured the lengths of the two perpendicular sides (sides that meet to form a 90° angle) of the triangle to the nearest $\frac{1}{2}$ inch, and then substituted those values into the formula for the area of a triangle, $A = \frac{1}{2}bh$, in which A represents the area, b represents the length of the base, and h represents the height (vertical distance from top to bottom). Substituting $b = 4$ and $h = 2\frac{1}{2}$, the student should have determined that $A = \frac{1}{2}(4)(2\frac{1}{2}) = 5$. |
| | Option B is incorrect | The student likely added the length of the hypotenuse (longest side) and the length of the base, calculating $4\frac{3}{4} + 4 = 8\frac{3}{4}$. The student needs to focus on how to calculate the area of a triangle. |
| | Option C is incorrect | The student likely added the length of the base and the length of the height. The student needs to focus on how to use the base and height of a triangle to calculate the area. |
| | Option D is incorrect | The student likely measured the three sides of the triangle correctly but calculated the perimeter (distance around the outside) instead of the area, rounded the sum of 4 inches, $2\frac{1}{2}$ inches, and $4\frac{3}{4}$ inches to the nearest inch, and did not notice that the measurement units were incorrect. The student needs to focus on understanding the difference between perimeter and area. |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 18 | Option J is correct | To determine how many bottles the pharmacist used for these vitamin pills (108), the student should have divided 4.536 by 0.042, which results in a quotient (answer to a division problem) of 108. |
| | Option F is incorrect | The student likely divided 4.536 by 0.042 with a decimal placement error, resulting in 10.8, and rounded this value to the nearest whole number. The student needs to focus on the correct placement of the decimal point when dividing a decimal number by another decimal number. |
| | Option G is incorrect | The student likely added 4.536 to 0.042 and rounded the sum to the nearest whole number. The student needs to focus on recognizing when a situation requires division to solve a problem. |
| | Option H is incorrect | The student likely divided 4.536 by 0.042, but did not include the digit of zero in the quotient. The student needs to focus on when to use digits of zero in the quotient when dividing numbers. |
| 19 | Option C is correct | To determine which statement about the stem and leaf plot is true, the student should have identified that the three leaves of "5" next to the stem of "8" represent percentages of 85, and the five leaves next to the "9" and "10" stems represent percentages of at least 90, so in all there are eight students who answered more than 80% of the questions correctly. |
| | Option A is incorrect | The student likely thought that the stem of "9" represented 9 students and the leaves of "0 0 5 5" associated with the stem of "9" meant that these 9 students answered 55% of the questions correctly. The student needs to focus on understanding how to interpret information displayed in a stem and leaf plot. |
| | Option B is incorrect | The student likely identified the stem of "7" as having the most leaves, but did not verify that half of the students were represented by the leaves next to the stem of "7." The student needs to focus on understanding that the stem with the greatest (largest) number of leaves on a stem and leaf plot does not represent half of the data displayed. |
| | Option D is incorrect | The student likely understood that leaf of "0" next to the stem of "10" represented a score of 100%, but incorrectly interpreted the stem of "10" as representing the number of students who answered 100% of the questions correctly. The student needs to focus on understanding how to interpret information displayed in a stem and leaf plot. |

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| Item# | Rationale | |
|-------|--|---|
| 20 | Option F is correct | To determine the amount Monique will earn if she works 40 hours in a week (\$330), the student should have calculated the hourly rate of pay represented by the information in the table by dividing any amount earned by the corresponding (paired) number of hours worked. Since Monique earned \$123.75 from working 15 hours, then the amount she earns per hour is represented by $\$123.75 \div 15$, which is \$8.25 per hour. Therefore, if Monique works 40 hours in a week, she will earn $40 \cdot \$8.25$, or \$330. |
| | Option G is incorrect | The student likely calculated the correct unit rate of \$8.25 per hour, but added it to the last dollar amount given in the table. The student needs to focus on how to use an hourly rate of pay to determine the amount earned for a given number of hours worked. |
| | Option H is incorrect | The student likely attempted to extend the table by subtracting \$198 from \$247.50 and then adding the result to \$247.50. The student needs to focus on how to use an hourly rate of pay to determine the amount earned for a given number of hours worked. |
| | Option J is incorrect | The student likely attempted to extend the table by subtracting \$123.75 from \$165 and then subtracting the result from \$123.75. The student needs to focus on how to use an hourly rate of pay to determine the amount earned for a given number of hours worked. |
| 21 | -6 and any equivalent values are correct | To determine the value of the x -coordinate (horizontal position from 0) of point P , the student should have determined how far to the left or right of the origin (point where the x -axis (horizontal) and y -axis (vertical) on a coordinate grid intersect; also the point represented by the ordered pair $(0, 0)$) point P is located. Because point P is located 6 units to the left of the origin, the value of the x -coordinate of point P is -6 . |

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| Item# | Rationale | |
|-------|-----------------------|---|
| 22 | Option H is correct | To determine which equation has a solution of $k = 6.5$, the student should have substituted the value of 6.5 for k in the equation $-7k = -45.5$ and determined that $-7 \cdot 6.5 = -45.5$. |
| | Option F is incorrect | The student likely substituted the value of 6.5 for k in the equation $-3k = 19.5$ and made a sign error when multiplying -3 by 6.5. |
| | Option G is incorrect | The student likely substituted the value of 6.5 for k in the equation $-1 + k = 7.5$ and made an error when adding 6.5 to -1 . |
| | Option J is incorrect | The student likely substituted the value of 6.5 for k in the equation $-2 + k = -8.5$ and made an error when adding 6.5 to -2 . |
| 23 | Option D is correct | To determine the decimal that represents the fraction of the \$20.00 Dolores spent, the student should have divided \$13.00 by \$20.00, which results in 0.65. |
| | Option A is incorrect | The student likely calculated the decimal that represents the fraction of the \$20.00 that Dolores didn't spend by subtracting \$13.00 from \$20.00 and dividing the result (\$7.00) by \$20.00. The student needs to focus on understanding how to represent the given part of a whole as a decimal. |
| | Option B is incorrect | The student likely thought that \$13.00 represented the percent of the money Dolores spent and divided it by 100. The student needs to focus on understanding how to represent the given part of a whole as a decimal. |
| | Option C is incorrect | The student likely calculated the amount Dolores didn't spend by subtracting \$13.00 from \$20.00, thought the result represented a percentage, and divided it by 100. The student needs to focus on understanding how to represent a part of a whole as a decimal. |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 24 | Option G is correct | To determine which expression is represented on the number line, the student should have identified that the number line shows 4 equal increments, where each increment represents -2 , and adding -2 four times is the same as $-2 \cdot 4$. |
| | Option F is incorrect | The student likely calculated the difference represented by $0 - (-8)$ incorrectly as -8 and identified this value as the result of the expression represented on the number line. The student needs to focus on interpreting the meaning of an expression represented on a number line. |
| | Option H is incorrect | The student likely recognized an expression that included both the increment of -2 represented on the number line and -8 , which is the result of the expression represented on the number line. The student needs to focus on interpreting the meaning of an expression represented on a number line. |
| | Option J is incorrect | The student likely identified -2 as the value of each increment represented on the number line and 4 as the number of increments represented on the number line, but misinterpreted the operation as division instead of multiplication. The student needs to focus on interpreting the meaning of an expression represented on a number line. |
| 25 | Option A is correct | The sum of the angle measures of a triangle is 180° . To determine which set of angle measures CANNOT be the angle measures of a triangle, the student should have added the given measurements and identified the set that does not add up to 180° . $60^\circ + 60^\circ + 61^\circ = 181^\circ$. |
| | Option B is incorrect | The student likely thought that none of the angle measures in a triangle could be 1° . The student needs to focus on understanding the relationship between the measures of the angles in a triangle. |
| | Option C is incorrect | The student likely thought that the degree measure of each angle in a triangle could only be a whole number. The student needs to focus on understanding the relationship between the measures of the angles in a triangle. |
| | Option D is incorrect | The student likely thought that the three degree measures of the angles in a triangle could not be consecutive whole numbers. The student needs to focus on understanding the relationship between the measures of the angles in a triangle. |

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| Item# | Rationale | |
|-------|-----------------------|--|
| 26 | Option J is correct | To determine that this situation can be represented by $17.35x > 624.60$, the student should have determined that $17.35x$ represents the amount of money Darren would earn for working x hours, so the inequality $17.35x > 624.60$ represents x , the number of hours Darren would need to work in order to earn more than \$624.60. |
| | Option F is incorrect | The student likely thought that the situation would be represented by an inequality that requires multiplication instead of addition. This situation can be represented by $x + 17.35 > 624.60$. The student needs to focus on recognizing situations that require multiplication. |
| | Option G is incorrect | The student likely thought that the situation would be represented by an inequality that requires multiplication instead of addition and did not realize that the situation would be represented by an equation instead of an inequality. This situation can be represented by $x + 17.35 = 624.60$. The student needs to focus on recognizing situations that require multiplication and the use of an inequality. |
| | Option H is incorrect | The student likely did not realize that the situation would be represented by an inequality that uses the symbol for "less than or equal to." This situation can be represented by $17.35x \leq 624.60$. The student needs to focus on recognizing situations that require the use of an inequality. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|---|
| 27 | Option C is correct | To determine which box plot best displays a summary of the data, the student should have identified that the list of numbers is ordered by value and that the minimum (least) value in the list is 6 and the maximum (greatest) value in the list is 14. The student should then have calculated the quartiles (values dividing the data set into quarters) by dividing the number of values in the list (12) by 4, getting a result of 3, and then determining where the quartiles (Q1, Q2, and Q3) will be located within the data set (6, 7, 7, <u>Q1</u> 8, 8, 8, <u>Q2</u> 9, 9, 10, <u>Q3</u> 11, 11, 14). The student should have calculated each quartile by adding the two values on either side of a quartile and dividing by 2 ($(7 + 8) \div 2 = 7.5$, $(8 + 9) \div 2 = 8.5$, and $(10 + 11) \div 2 = 10.5$). The box plot shows points at the minimum of 6, the first quartile of 7.5, the second quartile, or median, of 8.5, the third quartile of 10.5, and the maximum of 14. |
| | Option A is incorrect | The student likely calculated the median of the values to be 9 instead of 8.5. The student needs to focus on how to determine the median of a data set. |
| | Option B is incorrect | The student likely calculated the first quartile of the values to be 8 instead of 7.5 and calculated the third quartile of the values to be 11 instead of 10.5. The student needs to focus on how to determine the first quartile and third quartile of a data set. |
| | Option D is incorrect | The student likely calculated the median of the values to be 9 instead of 8.5, calculated the first quartile of the values to be 8 instead of 7.5, and calculated the third quartile of the values to be 11 instead of 10.5. The student needs to focus on how to determine the median, first quartile, and third quartile of a data set. |

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| Item# | Rationale | |
|-------|--|--|
| 28 | Option J is correct | To determine which list best represents the independent values of the graphed points, the student should have identified the x -coordinates (horizontal position from 0) of the graphed points. The points on the graph appear to be located at (1, 7.5), (2, 15), (3, 22.5), (4, 30), (5, 37.5), and (6, 45), so the independent values of the graphed points are 1, 2, 3, 4, 5, and 6. |
| | Option F is incorrect | The student likely identified the list that best represents all the x - and y -coordinates (vertical position from 0) of the points on the graph. The student needs to focus on understanding that the values of x -coordinates of a set of graphed points represent the independent values. |
| | Option G is incorrect | The student likely identified the list that contains the values shown on the y -axis (the vertical axis) on the graph. The student needs to focus on understanding that the values of x -coordinates of a set of graphed points represent the independent values. |
| | Option H is incorrect | The student likely identified the list that best represents the dependent values (values of the y -coordinates (vertical position from 0)) of the graphed points. The student needs to focus on understanding that the values of x -coordinates of a set of graphed points represent the independent values. |
| 29 | 18 and any equivalent values are correct | To determine the median (middle number in a set of numbers when the set is ordered by value) price of the watches in dollars (18), the student should have ordered the 8 prices and calculated the number halfway between the fourth-lowest and fifth-lowest prices. The prices listed in order would be 12, 15, 16, 16, 20, 22, 24, 27, and the number halfway between the fourth-lowest price of 16 and the fifth-lowest price of 20 is represented by $\frac{16 + 20}{2}$, which results in a median price in dollars of 18. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|---|
| 30 | Option H is correct | <p>To determine the list that shows the numbers in order from least (smallest) value to greatest (largest) value, the student should have changed the values in the list to the same form of number, resulting in a list of either all fractions or all decimals. The value of $-\frac{2}{5}$ expressed as a decimal is $-2 \div 5$, or -0.4, the value of $-2\frac{1}{2}$ expressed as a decimal is $-(2 + 1 \div 2)$, or -2.5, and the value of $\frac{21}{4}$ expressed as a decimal is $21 \div 4$, or 5.25. The numbers written in decimal form are listed in order from least to greatest as -2.5, -2.47, -0.4, 5, and 5.25. To convert all the decimals in the list to fractions for comparison, the student should have written -2.47 as $-2\frac{47}{100}$. The student then should have found the common denominator (bottom number) of 100 for all of the fractions $\left(-\frac{2}{5} = -\frac{40}{100}, -2\frac{1}{2} = -2\frac{50}{100}, \text{ and } \frac{21}{4} = \frac{525}{100} = 5\frac{25}{100}\right)$. The numbers written in fraction form are listed in order from least to greatest as $-2\frac{50}{100}$, $-2\frac{47}{100}$, $-\frac{40}{100}$, $5\frac{0}{100}$, and $5\frac{25}{100}$. The original numbers listed in order from least to greatest are $-2\frac{1}{2}$, -2.47, $-\frac{2}{5}$, 5, and $\frac{21}{4}$.</p> |
| | Option F is incorrect | <p>The student likely converted the fractions and mixed number to decimals, but listed the negative numbers from greatest value to least value instead of from least value to greatest value. The student needs to focus on understanding how to list negative numbers from least value to greatest value.</p> |

2018 STAAR Grade 6 Mathematics Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| | Option G is incorrect | The student likely divided 4 by 21 instead of dividing 21 by 4 when converting $\frac{21}{4}$ to a decimal, and listed the negative numbers from greatest value to least value instead of from least value to greatest value. The student needs to focus on understanding how to list negative numbers from least value to greatest value and how to convert an improper fraction (a fraction with a numerator that is greater than the denominator) to a decimal value. |
| | Option J is incorrect | The student likely divided 4 by 21 instead of dividing 21 by 4 when converting $\frac{21}{4}$ to a decimal. The student needs to focus on understanding how to convert an improper fraction (a fraction with a numerator that is greater than the denominator) to a decimal value. |
| 31 | Option A is correct | To determine the regular price of the mirror, the student should have calculated that since the percent discount (20%) multiplied by 5 is 100%, then the discount amount (\$3) multiplied by 5 is the regular price of the mirror, which results in \$15. |
| | Option B is incorrect | The student likely multiplied 3 by 20 and divided the result by 10. The student needs to focus on how to calculate the regular price of an item given the percentage of the discount and the dollar amount of the discount. |
| | Option C is incorrect | The student likely multiplied 0.2 times 3 and interpreted 0.6 as \$6. The student then likely added \$6 to the discount amount (\$3) to get \$9. The student needs to focus on how to calculate the regular price of an item given the percentage of the discount and the dollar amount of the discount. |
| | Option D is incorrect | The student likely calculated the correct regular price of the mirror but then added \$3 to it, thinking that the \$15 represented the price after the discount was applied. The student needs to focus on how to calculate the regular price of an item given the percentage of the discount and the dollar amount of the discount. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|---|---|
| 32 | Option H is correct | To determine which expression is equivalent to the one Keith wrote, the student should have combined the values in each of the two sets of parentheses based on the order of operations. The value of $127.50 - 23.50$ is 104, and the value of $86.50 + 4$ is 90.50, so the expression $104 + 3(90.50)$ is equivalent to $(127.50 - 23.50) + 3(86.50 + 4)$. |
| | Option F is incorrect | The student likely combined the values in each of the two sets of parentheses, but then incorrectly added the 3 to the 104, resulting in $107(90.50)$. The student needs to focus on using the order of operations to determine the value of a mathematical expression. |
| | Option G is incorrect | The student likely combined the values in each of the two sets of parentheses, but then incorrectly subtracted the 3 from the 104, resulting in $101(90.50)$. The student needs to focus on using the order of operations to determine the value of a mathematical expression. |
| | Option J is incorrect | The student likely subtracted 23.50 from 127.50, resulting in 104, but incorrectly multiplied 3 by 86.50 and then added 4, resulting in 263.50. The student needs to focus on using the order of operations to determine the value of a mathematical expression. |
| 33 | -14 and any equivalent values are correct | To determine the sum of the values of LuAnn's three cards (-14), the student should have added the three values together. The sum (answer to an addition problem) of the two negative values would be -17, and adding the value of 3 from the remaining card would give a sum of -14. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 34 | Option H is correct | To determine the volume (amount of three-dimensional space taken up) of water in the trough in cubic feet when the trough is full (70 ft^3), the student should have used the formula $V = Bh$, where V represents the volume, B represents the area (amount of space covered by a surface) of the base, and h represents the height (vertical distance from top to bottom), and calculated the area of the base of the prism as $7 \text{ feet} \cdot 2\frac{1}{2} \text{ feet}$, or $17\frac{1}{2} \text{ ft}^2$, and multiplied $17\frac{1}{2} \text{ ft}^2$ by the height, 4 ft, which results in 70 ft^3 . |
| | Option F is incorrect | The student likely calculated the perimeter (distance around the outside) of the base by adding 7 feet to $2\frac{1}{2}$ feet and doubling the result, and then added $2\frac{1}{2}$ feet to the result, thinking it was the height of the prism, and did not realize that the unit of measurement would be feet instead of cubic feet. The student needs to focus on understanding how to calculate the volume of a rectangular prism. |
| | Option G is incorrect | The student likely added the given dimensions together and did not realize that the unit of measurement would be feet instead of cubic feet. The student needs to focus on understanding how to calculate the volume of a rectangular prism. |
| | Option J is incorrect | The student likely calculated the perimeter (distance around the outside) of the base by adding 7 feet to $2\frac{1}{2}$ feet and doubling the result, and then multiplied the result by the height of 4 feet. The student needs to focus on understanding the difference between area and perimeter. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|---|
| 35 | Option A is correct | To determine that this situation can be represented by the equation $y = 74x$, the student should have determined that if 74 gallons of water are used per hour for x hours, then the expression $74x$ represents the total number of gallons of water used, which is also represented by the variable (symbol used to represent an unknown number) y . |
| | Option B is incorrect | This situation can be represented by the equation $y = 74 + x$. The student needs to focus on identifying situations that can be represented by equations in the form $y = kx$. |
| | Option C is incorrect | This situation can be represented by the equation $x + y = 74$. The student needs to focus on identifying situations that can be represented by equations in the form $y = kx$. |
| | Option D is incorrect | This situation can be represented by the equation $xy = 74$. The student needs to focus on identifying situations that can be represented by equations in the form $y = kx$. |
| 36 | Option G is correct | To determine the number that would be located in the shaded part of the diagram, the student should have determined that the shaded part of the diagram represents integers (positive and negative numbers with no fractional or decimal part, and zero) that are not whole numbers (positive numbers with no fractional or decimal part, and zero), which means only integers with negative values belong in the shaded part of the diagram, and -8 is an integer with a negative value. |
| | Option F is incorrect | The student likely determined the number should have a negative value, but did not realize the number should also be an integer. The student needs to focus on understanding what types of numbers are integers but not whole numbers. |
| | Option H is incorrect | The student likely did not understand what types of numbers should be located in the shaded part of the diagram, and identified a number that is neither an integer nor a whole number. The student needs to focus on understanding what types of numbers are integers but not whole numbers. |
| | Option J is incorrect | The student likely did not understand what types of numbers should be located in the shaded part of the diagram, and identified a number that is both an integer and a whole number. The student needs to focus on understanding what types of numbers are integers but not whole numbers. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 37 | Option D is correct | To determine that this statement about the employees is supported by the data in the bar graph, the student should have determined that the bar graph shows that the number of employees in Category I is 45 and that the number of employees in category II is 15, and verified that 45 is three times 15. |
| | Option A is incorrect | The student likely chose that this statement is supported by the data in the bar graph because the bar representing the number of employees in Category I is the tallest bar on the bar graph. The student needs to focus on using the information summarized in a bar graph to describe the data distribution. |
| | Option B is incorrect | The student likely determined that the number of employees in Category II is 15 and the number of employees in Category III is 30, but incorrectly interpreted the statement as the number of employees in Category II is twice the number of employees in Category III. The student needs to focus on using the information summarized in a bar graph to describe the data distribution. |
| | Option C is incorrect | The student likely determined that the total number of employees in Categories II and III is equal to the number of employees in Category I, but did not realize that the total number of employees in Categories II and III is not greater than the number of employees in Category I. The student needs to focus on using the information summarized in a bar graph to describe the data distribution. |

2018 STAAR Grade 6 Math Rationales

| Item# | Rationale | |
|-------|-----------------------|--|
| 38 | Option H is correct | To determine h , the height (vertical distance from top to bottom) of the rectangle, the student should have used the given information and the formula for the area (amount of space covered by a surface) of a rectangle, $A = bh$, in which b represents the length of the base and h represents the length of the height. Substituting 375 for A and 25 for b , the student should have solved the equation $375 = 25h$ by dividing both sides of the equation by 25, resulting in $h = 15$. |
| | Option F is incorrect | The student likely subtracted 25 centimeters from 375 square centimeters without realizing the units in the two measurements are not the same. The student needs to focus on understanding how to determine the height of a rectangle, given the area and the width. |
| | Option G is incorrect | The student likely divided 375 square centimeters by 25 centimeters and then divided the result by 2. The student needs to focus on understanding the formula for calculating the area of a rectangle. |
| | Option J is incorrect | The student likely used the formula for the perimeter (distance around the outside) of a rectangle, $P = 2l + 2w$, substituted 375 for p , 25 for w (width), and solved for l (length). |