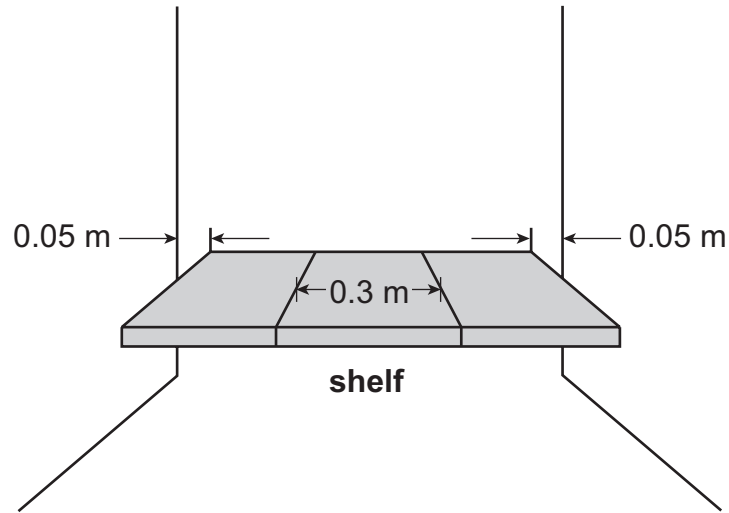## MULTIPLE-CHOICE QUESTIONS

> **You may <u>not</u> use a calculator for questions 1–4.**

A-N.1.1.1

1. Joslyn built the shelf shown below to fit into a narrow closet.

0.05 m → | ← → | ← 0.05 m

←0.3 m→

shelf

The shelf is made of 3 pieces of wood, each 0.3 meter wide. There is also 0.05 meter of space between the shelf and the wall on each side. What is the width, in meters, of Joslyn's closet?

A. 0.4   *uses only the three numbers in the diagram*

B. 0.8   *finds the correct combined width of the three boards but subtracts the two spaces*

C. 1   *

D. 1.9   *treats 0.05 as 5 tenths*

A-N.1.1.3

2. Multiply: $\dfrac{7}{8} \times 1\dfrac{2}{3}$

   A. $1\dfrac{11}{24}$ *

   B. $1\dfrac{7}{12}$ | *multiplies the fractions together and keeps the whole number* |

   C. $1\dfrac{19}{21}$ | *converts to improper fractions and then cross-multiplies to get 40/21* |

   D. $2\dfrac{1}{3}$ | *incorrectly converts 1-2/3 to 8/3 instead of 5/3* |

A-N.1.1.3

3. Which value is equivalent to $0.45 \div \dfrac{9}{10}$?

   A. $\dfrac{81}{200}$ | *does not take the reciprocal of 9/10* |

   B. $\dfrac{1}{2}$ *

   C.   40.5 | *multiplies 45 × 9 and then divides by 10* |

   D.   50 | *treats 0.45 as 45/1 and multiplies it by 10/9* |

B-E.2.3.1

4. Which estimate is **closest** to the value of $3\frac{7}{8} \times 5\frac{1}{16}$?

A. 15 | *rounds both values down (to 3 and 5, respectively)* |

B. 18 | *rounds down to 3 and up to 6* |

C. 20   *

D. 24 | *rounds both values up (to 4 and 6, respectively)* |

A calculator is permitted for use in solving questions numbered 5–50 in this sampler.

A-N.1

5. Ty is determining the value of the expression below.

$$-0.25(-3.25 + 5.65)$$

Which shows two expressions that are equivalent to Ty's expression?

A. $-0.25(8.9)$

    $\dfrac{-5.65}{4} + \dfrac{3.25}{4}$

| *1st expression: adds 3.25 and 5.65; 2nd expression correct* |

B. $13 + 22.6$

    $-25(2.4) \div 100$

| *1st expression: divides -3.25 and 5.65 by -0.25, forgets to change sign between addends; 2nd expression correct* |

C. $-\left(\dfrac{2}{4} + \dfrac{0.4}{4}\right)$

    $-25(-325 + 565)$

| *1st expression correct; 2nd expression: multiplies each term by 100* |

D. $2.4 \div (-4)$

    $-0.25[(-3.25 + 3.25) + 2.4]$

    *

A-N.1.1

6. After a party, there are parts of three pizzas remaining. There is $\frac{3}{4}$ of a pepperoni pizza remaining, $\frac{5}{8}$ of a cheese pizza remaining, and $\frac{11}{12}$ of a sausage pizza remaining. The 5 friends who organized the party split the remaining pizza equally. What fraction of a whole pizza does each person get?

A. $\frac{5}{24}$ | *adds numerator and denominator, subtracts from 1* |

B. $\frac{11}{24}$ *

C. $\frac{1}{2}$ | *converts 5/8 as 20/24* |

D. $\frac{11}{20}$ | *uses common denominator of 12, thinks 8 goes into 12 twice* |

A-N.1.1.2

7. Corrine plans to spend $20 on a new shirt, $13 on dinner, and $4 on a bus ticket. She knows that she will earn $30 for baby-sitting. Which number line represents a strategy for determining how many more dollars Corrine needs to earn so that she earns exactly as much as she plans to spend?
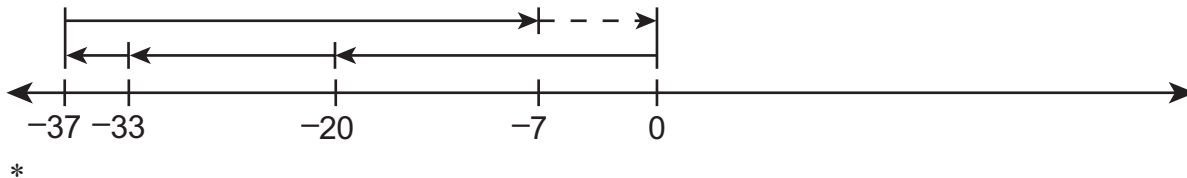
A.
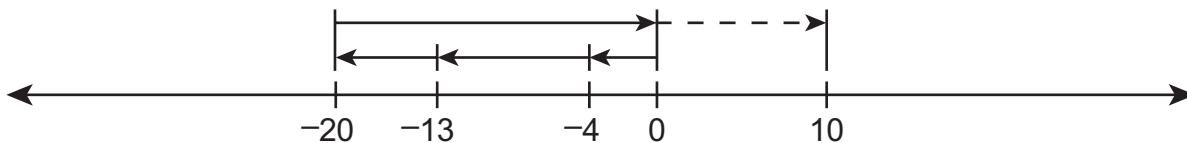
does not show operation (⁻20) + (⁻13) + (⁻4)+30 + x; places individual costs on number line then shows (⁻20) + (20 + 10)
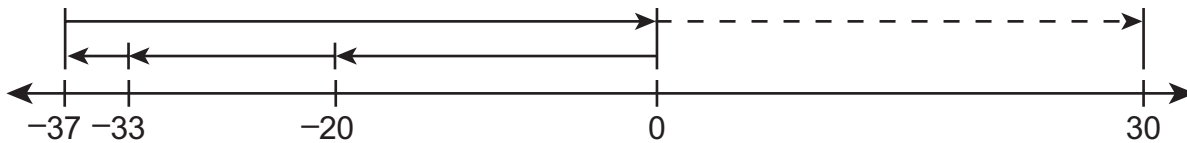
B.
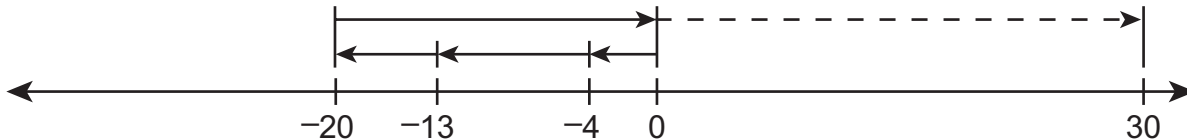
does not show operation (⁻20) + (⁻13) + (⁻4) + 30 + x; places costs and earnings on number line

C.

*

D.

does not show operation (⁻20) + (⁻13) + (⁻4) + 30

A-N.1.1.3

8. Keyana put 0.83 liter of water into a bucket. Matt put 0.98 liter of water into another bucket. When they combined their water into a bigger bucket, 10% of the water spilled out. The water they collected had a weight of 1.021 kilograms per liter of water. The expression shown below represents the weight, in kilograms, of the water in the bigger bucket.

$$[0.9(0.83 + 0.98)] \times 1.021$$

Rounded to the nearest thousandth, what is the weight, in kilograms, of the water in the bigger bucket?

A. 1.663 *

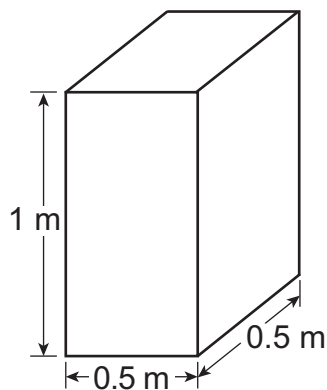B. 1.748 | *0.9 × 0.83 + 0.98 × 1.021, does not distribute 0.9 (90%) nor 1.021* |

C. 1.763 | *(0.9 × 0.83 + 0.98) × 1.021, distributes 1.021, but not 0.9* |

D. 1.848 | *(0.83 + 0.98) × 1.021, does not multiply by 0.9 to account for 10% spilled* |

A-R.1.1.1
C-G.2.2.2

9. Simon is filling the water tank shown below.

After 2 minutes, the tank is filled up to $\frac{1}{5}$ of its height. What is the rate, in cubic meters per minute, at which Simon is filling up the water tank?
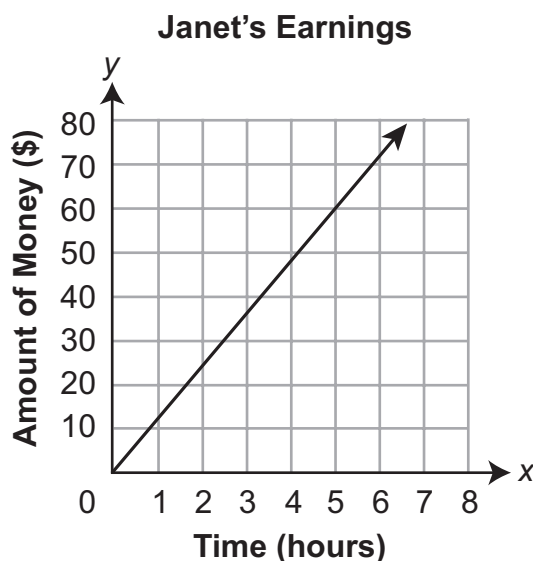
A. 0.025   *

B. 0.050 | *only multiplies 1/5 of height by 1 side when determining volume (forgets width)* |

C. 0.100 | *calculates 1/5 ÷ 2* |

D. 0.125 | *forgets to take 1/5 of height* |

A-R.1.1.2

10. The graph below models the relationship between the time (*x*), in hours, Janet works and the amount of money (*y*), in dollars, she earns.

Janet's Earnings

Which statement explains how Janet knows that the number of hours she works and the amount of money she earns are proportionally related?

A.   The graph is a straight line with a positive slope.

   | *identifies a trait of the line* |

B.   The graph is a straight line that passes through (0, 0).

   *

C.   The graph is a straight line that passes through (1, 12.5).

   | *identifies the unit rate and thinks since it passes through x = 1 it must be a proportional relationship* |

D.   The graph is a straight line with no negative *x* or *y* values.

   | *thinks proportional relationships must represent positive quantities* |

A-R.1.1.2
A-R.1.1.3

11. Which graph shows a proportional relationship with a unit rate of $\frac{3}{2}$?

A.
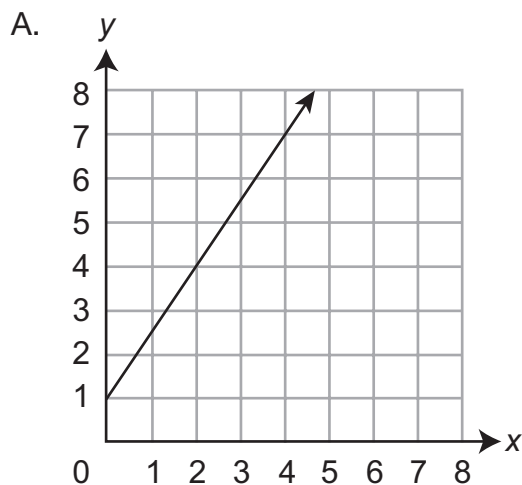
does not consider whether or not it passes through the origin

B.

*

C.
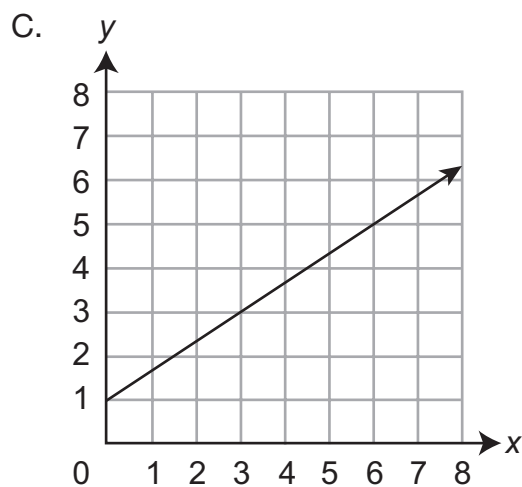
inverts the slope and does not consider whether it passes through the origin or not

D.
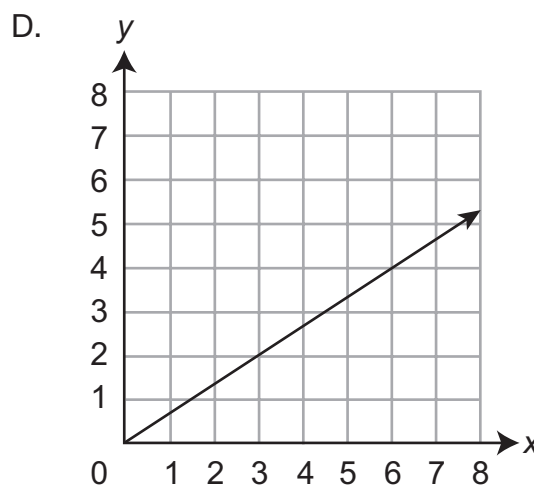
inverts the slope, run/rise

A-R.1.1.3

12. The graph below shows the relationship between the number of pages printed (*x*) at a print shop and the total price (*y*), in dollars.
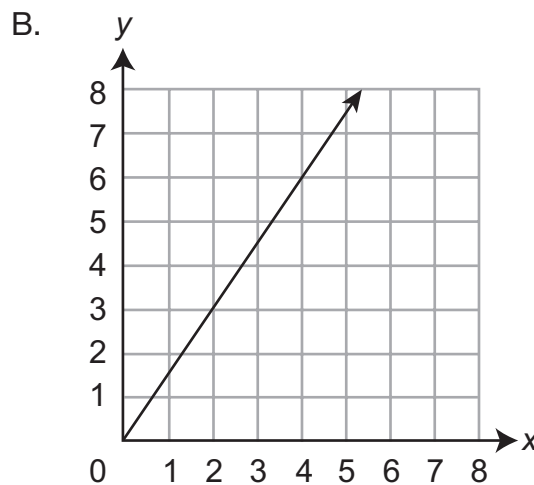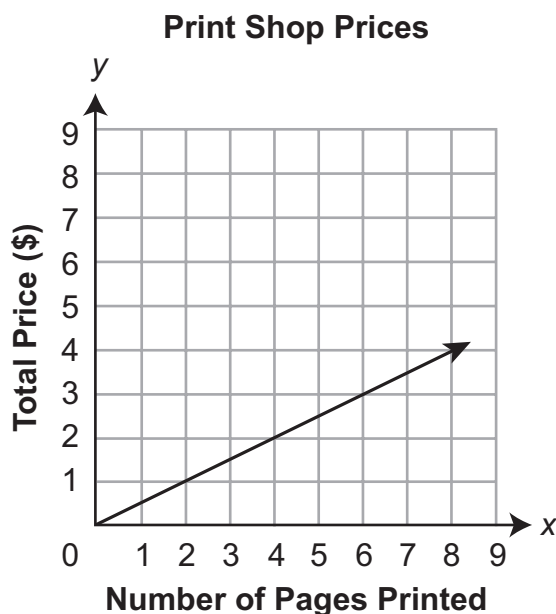
Print Shop Prices

Based on the graph, what is the unit price at the print shop?

A. $0.10 per page   *looks at the point (2, 1) and thinks the 1 represents 10 cents*

B. $0.20 per page   *looks at (2, 1) and thinks the 2 represents 20 cents*

C. $0.25 per page   *estimates the y-coordinate at x = 1*

D. $0.50 per page   *

A-R.1.1.3
A-R.1.1.2

13. The table below shows the relationship between the number of water bottles at a park that are thrown away and the number of water bottles at the park that are recycled for each of five months.

Water Bottles at a Park

Month	Water Bottles Thrown Away	Water Bottles Recycled
1	40	12
2	50	15
3	80	24
4	110	33
5	140	42

Which statement correctly describes the relationship between the number of water bottles that are thrown away and the number of water bottles that are recycled at the park each month?

A. The relationship is proportional. For every 3 bottles that are thrown away each month, 10 bottles are recycled.

  reverses rate

B. The relationship is proportional. For every 10 bottles that are thrown away each month, 3 bottles are recycled.
  *

C. The relationship is not proportional. The number of water bottles that are thrown away increases more from month to month than the number of water bottles that are recycled.

  thinks change from month to month has to be the same for each

D. The relationship is not proportional. The difference between the number of bottles that are thrown away and the number of bottles that are recycled is not the same for each month.

  confuses rate with difference

A-R.1.1.3
A-R.1.1.6

14. A technician tests batteries for a battery manufacturer several times each week. She determines that the number of defective batteries is proportional to the number of batteries tested. The table below shows the numbers of batteries the technician tested at two different times during week 1 and the number of defective batteries she found each time.

Battery Test Results for Week 1

Number Tested	Number Defective
160	4
600	15

Between week 1 and week 2, the battery manufacturer changed its process. The number of defective batteries is still proportional to the number of batteries tested, but the constant of proportionality is greater. The technician tested 480 batteries during week 2 and found that 18 were defective. By what percent did the constant of proportionality increase?

A. $33\frac{1}{3}\%$ | *160 ÷ 480* |

B. 50%   *

C. $66\frac{2}{3}\%$ | *finds the unit rate as 40 to 1 for week 1, and 26-2/3 to 1 for week 2; divides 26-2/3 by 40; changes to a percent* |

D. 125% | *600 ÷ 480 = 1.25; changes to a percent* |

A-R.1.1.4
A-R.1.1.2

15. A concert hall sells tickets in three different price ranges. For each price range, there are both adult and child rates.

Concert Hall Prices

Adult Tickets	Child Tickets
$82.00	$20.50
$56.00	$14.00
$36.00	$9.00

Which statement describes the relationship between the adult ticket prices (*a*), in dollars, and the child ticket prices (*c*), in dollars?

A.   The relationship is proportional. It can be represented as $c = \frac{1}{4}a$.
*

B.   The relationship is proportional. It can be represented as $c = 4a$.

> *confuses 4 with 1/4*

C.   The relationship is not proportional. The change in *a* is not constant, and therefore the relationship cannot be expressed as one equation.

> *thinks proportional needs constant change in table x-values*

D.   The relationship is not proportional. The change in *c* is not constant, and therefore the relationship cannot be expressed as one equation.

> *thinks proportional needs constant change in table y-values*

A-R.1.1.5

16. When Rachel exceeds the number of minutes on her cell phone plan, she is charged an extra cost for each minute. The graph below shows the total cost (y), in dollars, for exceeding her cell phone plan's minutes by x minutes.

**Cost for Exceeding
Cell Phone Plan's Minutes**
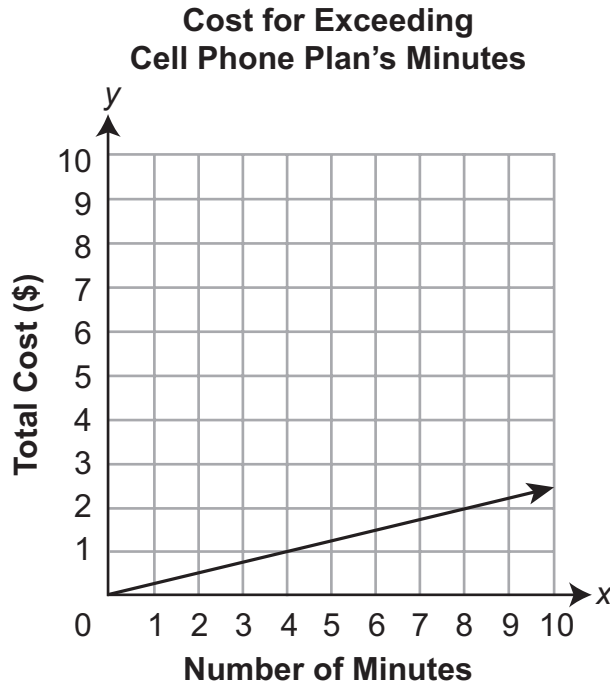
What does the y-coordinate represent when the x-coordinate has a value of 1?

A. Rachel pays $0.25 for each minute she exceeds her cell phone plan's minutes.
*

B. Rachel pays $0.50 for each minute she exceeds her cell phone plan's minutes.

> assumes the point is (1, 0.5)

C. Rachel pays $1.00 for each minute she exceeds her cell phone plan's minutes.

> thinks the x-coordinate represents the cost per minute

D. Rachel pays $4.00 for each minute she exceeds her cell phone plan's minutes.

> looks at the point (4, 1)

A-R.1.1.6

17. Kenneth is making chocolate cakes. For each cup of milk he uses, he needs to use $1\frac{3}{4}$ cups of flour. For each cup of flour he uses, he needs to use $\frac{3}{7}$ cup of cocoa powder. Kenneth is making enough cakes that he needs to use 4 cups of milk. How many cups of cocoa powder does Kenneth need to use?

A. $\frac{3}{28}$ | *divides 3/7 by 4* |

B. $\frac{12}{7}$ | *multiplies 3/7 by 4* |

C. 3   *

D. 7 | *finds the amount of flour needed* |

A-R.1.1.6
A-R.1.1.3

18. The graph below represents the amount of simple interest (I), in dollars, earned on an investment of P dollars over one year. The interest rate is r.

Interest Earned over One Year
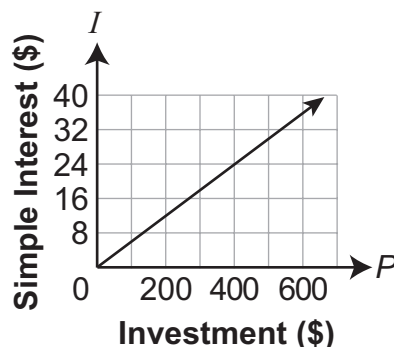
An investment of $600 at a different interest rate (q) will earn $24 in simple interest over one year. Which statement about interest rates r and q is true?

A.   Interest rate r is 2% greater than interest rate q.   *

B.   Interest rate r is 8% less than interest rate q.

> *(600 – 400)/24, rounds to the nearest whole number*

C.   Interest rate q is 12% less than interest rate r.

> *uses (600, 36) on graph; finds 36 – 24*

D.   Interest rate q is the same as interest rate r.

> *uses (400, 24) on graph, ignores the difference in amount invested*

B-E.2.1.1
B-E.2.3.1

19. Ryan is training for a bicycle race.

- The distance he rides is $44\frac{1}{2}$ miles long.

- He rides a portion of the distance at a slow speed both to warm up and to cool down.

- Ryan rides $\frac{4}{5}$ of the distance at a fast speed for training.

- Of the slow-speed portion, $\frac{1}{3}$ is for the warm-up.

Which estimate is **closest** to the distance, in miles, Ryan rides to cool down?

A. 3   *warm-up distance*

B. 6   *

C. 9   *entire slow-speed distance*

D. 12   *(4/5)(1/3) = 4/15; (4/15)(44 – 1/2) and rounds up*

B-E.2.2

20. The pressure on an object that is underwater increases by 4.3 pounds per square inch for every 10 feet the depth of the object increases. The equation below represents this relationship.

$$y = 0.43x + 14.7$$

Based on the relationship, which statement about the variable x in the equation is true?

A. The variable x is the dependent variable in the relationship and represents the depth, in feet, of the object.

> *x is the independent variable*

B. The variable x is the independent variable in the relationship and represents the depth, in feet, of the object.
   *

C. The variable x is the dependent variable in the relationship and represents the pressure, in pounds per square inch, on the object.

> *x is the independent variable and represents the depth*

D. The variable x is the independent variable in the relationship and represents the pressure, in pounds per square feet, on the object.

> *x represents the depth*

B-E.2.2.1

21. Kyle sold an antique through an online auction website. The website host charged Kyle $15, plus 2.5% of the final selling price of the antique. After selling the antique, Kyle had to pay the website host $32. What was the final selling price of the antique?

A. $68   *divides 17 by 0.25*

B. $600   *divides 15 by 0.025*

C. $680   *

D. $1,280   *divides 32 by 0.025 (does not subtract the $15 charge)*

B-E.2.2.1

22. Mary earned $35.00 for walking her neighbor's dogs.

- Mary charged a flat fee of $5.00 to walk the dogs.

- Mary also charged $2.50 for each $\frac{1}{4}$ hour she walked the dogs.

For exactly how many hours did Mary walk her neighbor's dogs?

A. 3   *

B. 4 | adds 35.00 and 5.00; divides result by 10 (2.50 × 4) |

C. 6 | uses 1/2 hour rate instead of 1/4 hour rate |

D. 12 | divides 30.00 by 2.50; neglects 1/4 hour rate |

B-E.2.2.1

23. Mr. Jones is taking his family to see a play. There are 10 people going to the play, and they take 2 cars. Mr. Jones pays $5.50 for parking for each car. He pays the same price for each ticket. Mr. Jones is charged a total of $142.00 for tickets and parking. What is the price of each ticket to the play?

A. $6.55 | divides by 2 first |

B. $13.10   *

C. $13.65 | only subtracts one parking cost |

D. $14.20 | divides the total by 10 |

B-E.2.2.1

24. Students in a dance class filled out a survey. There were 25 girls and some boys who participated in the survey. The results showed that 20% of the students prefer tap dance to ballroom dance. There are 9 students who prefer tap dance. Which equation can be used to find the number of boys (x) who participated in the survey?

A. $0.2x + 25 = 9$ | *forgets the parenthesis or distributes 20% only to the boys* |

B. $0.2(x + 25) = 9$ *

C. $0.2(25 - 9) = x$ | *takes 9 out of girls* |

D. $25 + x = 0.2 \times 9$ | *takes 20% of 9 and sets equal to sum of boys and girls* |

B-E.2.2.2

25. A real estate agent earns $2,000 per month plus 5% of the selling price of each house sold. The agent wants to earn more than $60,000 this year. Which inequality represents the possible combined selling price (x) of all the houses sold during the year for the real estate agent to meet his goal?

A. $x > 11,600$ | *solves 2,000 + 5x > 60,000* |

B. $x > 180,000$ | *24,000 + 5x > 60,000 but multiplies by 5 instead of dividing* |

C. $x > 720,000$ *

D. $x > 1,160,000$ | *solves 2,000 + 0.05x > 60,000* |

B-E.2.2.2

26. Heidi must correctly answer at least 80% of the questions on an exam to advance to the next level in her online course. Heidi has already correctly answered 26 questions and incorrectly answered 4 questions. How many of the 15 questions remaining must Heidi correctly answer to advance to the next level?

A. at least 10   *

B. at least 11 | 26 – 15 |

C. at least 12 | 80% of 15 |

D. at least 13 | solves 30/26 = 15/x |

C-G.1.1.1
C-G.1.1.4

27. A machine part consists of two cylinders aligned along the same vertical axis. A scale drawing of the part is represented below.

Scale
1 cm : 3 in.
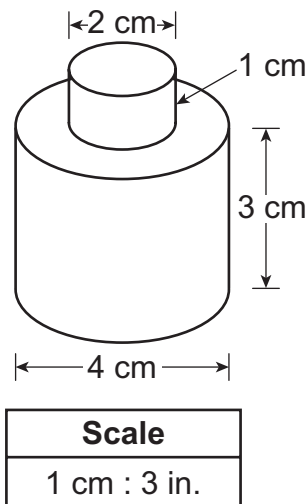
The part is cut in half through the vertical axis. What is the total area, in square inches, of the actual two-dimensional cross-section that is the result of the cut?

A. 42 sq in. | *calculates areas, then multiplies by 3*

B. 72 sq in. | *combines to a single set of dimensions: $6 \times 4 = 24$; $24 \times 3 = 72$*

C. 126 sq in. | *

D. 216 sq in. | *combines to a single set of dimensions of 6 by 4; applies scale and multiplies 18×12*

C-G.1.1.1
C-G.2.2.1

28. A city is building a new pool. A scale drawing of the pool is shown below.
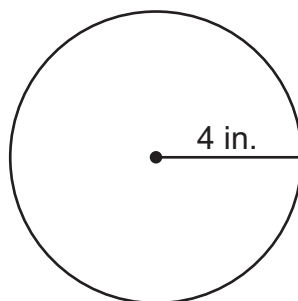
Scale
1 in. : 3 ft

What is the area, in square feet, of the pool?

A. 16π $4{\wedge}2 \times \pi$

B. 24π $2 \times \pi \times r = 2 \times \pi \times 12$

C. 48π $4{\wedge}2 \times \pi \times 3$

D. 144π *

C-G.1.1.2

29. Triangle ABC is shown below.
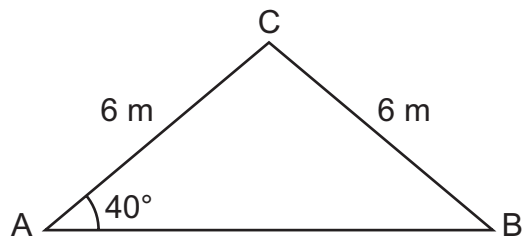
What is the measure of angle C?

A. 40° | applies isosceles triangle property of two equal angles to the wrong angle |

B. 90° | judges based on visual approximation |

C. 100°   *

D. 140° | calculates 180 – 40 without accounting for the third angle |

C-G.1.1.4

30. A three-dimensional solid is sliced by a plane perpendicular to a base of the solid. The result of the slice is an isosceles trapezoid. Which figure could be the three-dimensional solid?

A.

*
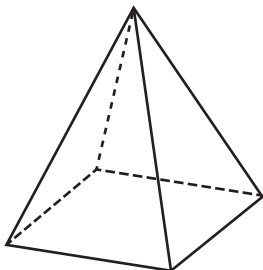
B.
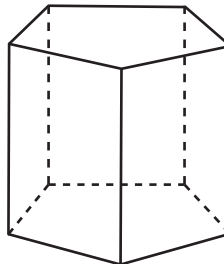
The base can be divided into an isosceles trapezoid and a pentagon, but the shape of the slice is not an isosceles trapezoid.

C.
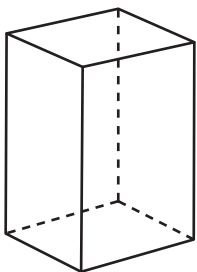
The shape of the slice is not an isosceles trapezoid.

D.
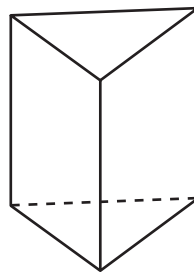
The base is divided into an isosceles trapezoid and a triangle, but the shape of the slice is a rectangle.

C-G.2
C-G.1.1.2

31. Mika will use copies of one of the triangles shown in the diagram below to cover a rectangular poster as completely as possible.
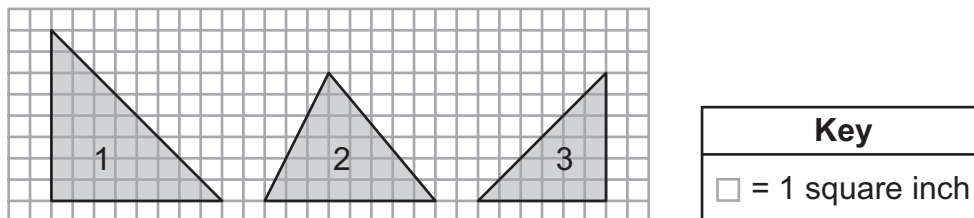
The poster is 12 inches wide and has an area of 480 square inches. The triangle Mika will use is isosceles. The copies are all full size and do not overlap on the poster. Which set of statements identify the triangle Mika should use to cover the poster as completely as possible and the area of the poster that will remain uncovered?

A.   Mika should use triangle 1, and no portion of the poster will remain uncovered.

selects an isosceles triangle, but does not consider dimensions of the rectangle and divides 480 by 32, the area of the triangle; however, each triangle has a height of 8 inches, so the area could not be completely covered

B.   Mika should use triangle 2, and no portion of the poster will remain uncovered.

does not recognize triangle 2 as non-isosceles; does not consider dimensions of rectangle, divides 480 by 24, area of the triangle

C.   Mika should use triangle 3, and 48 square inches of the poster will remain uncovered.
     *

D.   Mika should use triangle 3, and 12 square inches of the poster will remain uncovered.

area of triangle 3=18, does not consider dimensions of poster, divides 480÷18=26.6; uses 26 triangles and determines 480 – (26)(18) is uncovered

C-G.2.1.2

32. In the figure shown below, lines *j* and *k* are parallel.
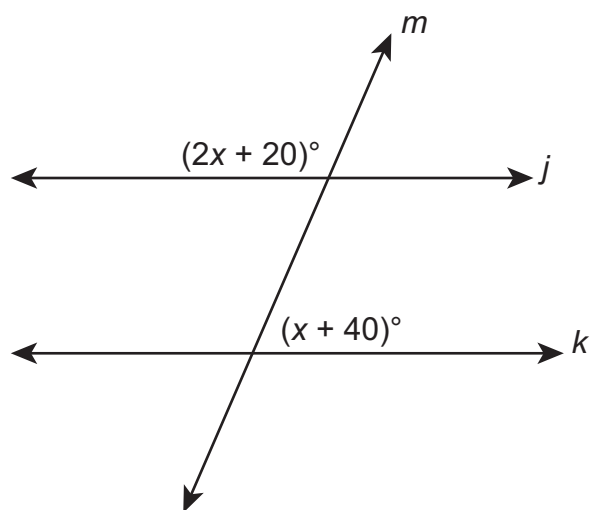
Which equation can be used to find the value of *x* in the figure?

A. $(x + 40) = (2x + 20)$ | thinks the two angles are congruent |

B. $2(x + 40) = 2x + 20$ | estimates based on the picture and thinks the larger angle is equal to twice the smaller |

C. $(x + 40) + (2x + 20) = 90$ | thinks the two angles are complementary |

D. $(x + 40) + (2x + 20) = 180$ *

C-G.2.2.1

33. A circular lampshade with a diameter of 14 inches has a length of wire that goes around it exactly one time. How many inches of wire are needed to go around the lampshade exactly one time?

A. 7π | uses $C = \pi r$ instead of $C = 2\pi r$ |

B. 14π *

C. 49π | finds the area |

D. 196π | squares the diameter |

C-G.2.2.1
C-G.1.1.1

34. The figure below represents a circular fountain.
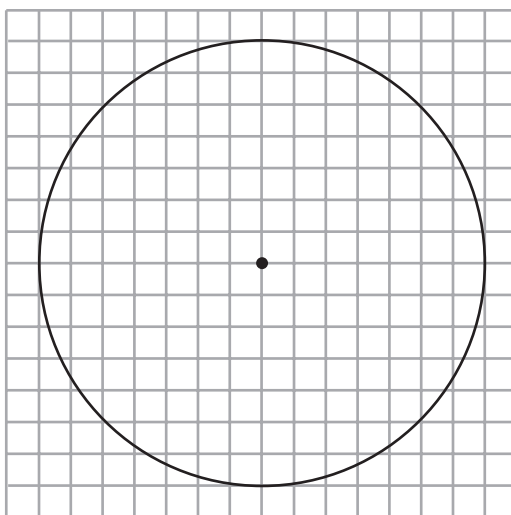
Key

$\square = \dfrac{1}{4}$ foot

Rounded to the nearest square foot, what is the area of the fountain?

A. 10   *

B. 11 | finds the circumference |

C. 38 | $7^2 \times \pi$ and then divides it by 4 |

D. 44 | finds the circumference but does not adjust for the scale |

C-G.2.2.2

35. Shannon has several cubes. Each cube is 3 feet high. Shannon covers all but one face of each cube with foil. She uses a total of 360 square feet of foil to cover the faces. How many cubes does Shannon have?

A. 8   *

B. 10 | 4 faces of each cube covered |

C. 24 | multiplies 3 by 5 to find surface area of 5 faces, divides 360 by 15 |

D. 40 | divides 360 by 3 squared |

C-G.2.2.2
C-G.2.2.1

36. Marcus wants to decorate his box that is in the shape of a cube. He decides to cover the entire box with red colored paper except the circle with his name on it. The box is shown below.
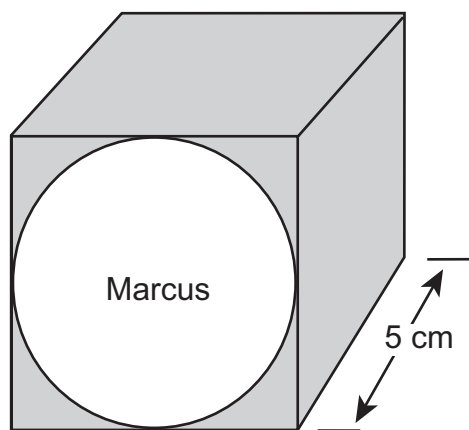
Rounded to the nearest square centimeter, how much red paper is needed to cover Marcus's box?

A. 72 | correct surface area but takes 5 cm as radius of the circle instead of 2.5 |

B. 105 | takes the volume instead of area or forgets the bottom side but subtracts the area of the circle |

C. 130   *

D. 150 | takes entire surface area of the cube but does not subtract the area of the circle |

D-S.1.1.2

37. Four candidates are running for school president. A random sample of students at the school are surveyed about which of the candidates they are likely to choose. The chart below shows the number of students from the random sample who chose each candidate.

School Election Survey

Deb	Janelle	Rasheed	Terry
10	20	12	8

A total of 800 students are expected to vote in the election for school president. Based on the information shown in the chart, which election outcome is **most likely**?

A. Rasheed will win with 192 votes.

> *number of votes is correct, but outcome is incorrect*

B. Rasheed will win with 189 more votes than he had in the survey.

> *figures winner needs 201 (1 more vote than 1/4 of 800); subtracts 12 from this number*

C. Janelle will win with 8 more votes than the second-place finisher, Rasheed.

> *bases vote totals on sample only*

D. Janelle will win with 128 more votes than the second-place finisher, Rasheed.
 *

D-S.2.1

38. The miles-per-gallon averages for random samples of cars and of small trucks are shown in the box-and-whisker plots below.

Cars and Small Trucks
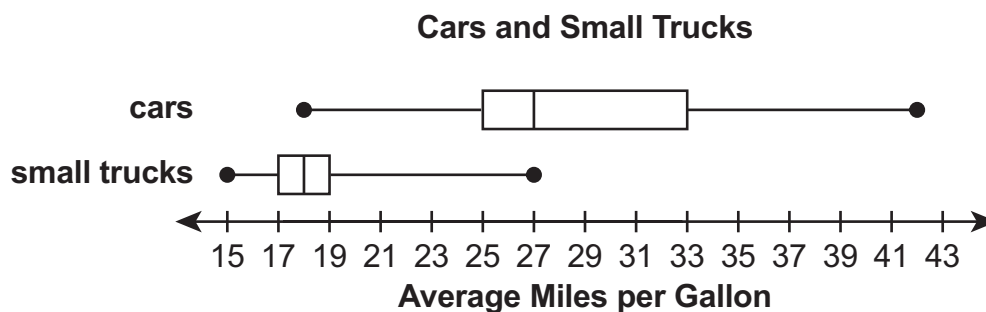
Based on the box-and-whisker plots, which statement about the miles-per-gallon averages of the cars and small trucks is **most likely** true?

A.   About 50% of the cars and 50% of the small trucks get between 18 and 27 miles per gallon.
*

B.   About 50% of the cars and 25% of the small trucks get between 25 and 33 miles per gallon.

true for cars, but not true for small trucks

C.   About 75% of the cars get a greater average number of miles per gallon than any small truck in the small truck sample.

would be true for 50% of cars; confuses median value for cars with 1st quartile value for cars

D.   About 75% of the small trucks get a lesser average number of miles per gallon than the least number of average miles per gallon of any car in the car sample.

would be true for about 50% of small trucks; reads the median value for small trucks as the 3rd quartile value

D-S.3.1.1

39. A computer scientist writes a program to generate single-digit and double-digit numbers using the digits 1 and 2. The probabilities the scientist used in the program are shown in the table below.

Numbers Generated

Description	Probability
single-digit number containing only 1	$\frac{3}{10}$
single-digit number containing only 2	$\frac{3}{10}$
double-digit number containing only 1s	$\frac{1}{10}$
double-digit number containing only 2s	$\frac{1}{10}$
double-digit number containing a 1 and a 2	$\frac{1}{5}$

Which statement about the likelihood of a number being generated by the program is true?

A. The program is unlikely to generate a double-digit number.

> *thinks outcome is unlikely since double-digit numbers account for 4/10, or less than half, of all outcomes*

B. The program is more likely to generate a single-digit number than a double-digit number.
 *

C. The program is equally likely to generate a single-digit number as a double-digit number.

> *thinks outcomes must be equally likely since two number types generated*

D. The program is more likely to generate a double-digit number containing only 1s or only 2s than a double-digit number containing a 1 and a 2.

> *thinks two categories of double-digit numbers means more likely than a single category of double-digit numbers; actually equally likely*

D-S.3.2.1
D-S.3.2.2

40. The number of paper clips of each color in a box is shown in the table below.

Paper Clips in a Box

Color	Number of Paper Clips
red	50
blue	75
green	100

Margo randomly selects 1 paper clip from the box, records its color, and returns it to the box. She does this 10 times. Which table shows experimental results from Margo's selections that are **closest** to the expected results when based on the probabilities of selecting a paper clip of each color from the box?

A.   **Margo's Selections**

Color	Number of Times Selected
red	3
blue	3
green	4

    *

B.   **Margo's Selections**

Color	Number of Times Selected
red	1
blue	4
green	5

sees increase of 1, 4, 5 just as red, blue, green increases

C.   **Margo's Selections**

Color	Number of Times Selected
red	0
blue	2
green	8

since red is least color in box, thinks 0 selections would be expected

D.   **Margo's Selections**

Color	Number of Times Selected
red	1
blue	5
green	4

only focuses on red being least; blue should not be greater than green

D-S.3.2.2

41. The table below shows the numbers of game chips of different colors in a bag.

Chips in a Bag

Chip Color	Number of Chips
yellow	8
green	5
blue	4
red	3

Danielle randomly selects one chip from the bag. Which statement about the selection is true?

A.   The probability of selecting a red chip is $\frac{1}{3}$.

        1 chip selected / 3 red chips in bag

B.   Selecting a yellow, green, or blue chip is certain.

        missing red to be certain

C.   The probability of selecting a green chip is $\frac{1}{20}$.

        1 chip selected / total number of chips in bag

D.   Selecting a blue or red chip is less likely than selecting a yellow chip.

        *

D-S.3.2.2

42. Charlene has 12 plastic cups. Of the 12 plastic cups, 3 are green, 4 are red, and 5 are blue. She stacks the cups into a single stack in random order. What is the probability that the cup on top of the stack is **not** green?

A. $\frac{1}{4}$ | finds probability of green |

B. $\frac{2}{5}$ | adds 1/3 and 5/12 by adding the numerators and denominators to get 6/15, then reducing |

C. $\frac{2}{3}$ | assumes each color is equally likely (does not use 3, 4, 5) |

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

D-S.3.2.2
C-G.1.1.4
C-G.2.2.2

43. A carpenter will make a single, straight cut through the rectangular prism shown below by randomly choosing a face and cutting parallel to that face. The cut will be a whole number of centimeters from the chosen face.

8 cm

4 cm

25 cm
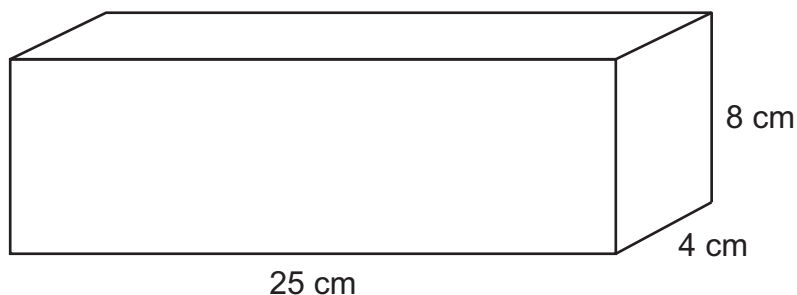
What is the probability that the area, in square centimeters, of the cross section created by the cut will **not** be a multiple of 100?

A. 0   *thinks there is only one cross section (which measures 8 × 4)*

B. $\frac{1}{3}$ *

C. $\frac{2}{3}$ *finds the number of cross sections with an area that is a multiple of 100*

D. 1   *does not consider the 8 × 4 cross section*

D-S.3.2.3

44. Keisha has a bag containing blue, green, orange, and red marbles. The number of marbles of each color is shown in the table below.

Marble Colors

Color	Number of Marbles
blue	75
green	50
orange	100
red	25

Keisha randomly selects 1 marble from the bag, records its color, and returns the marble to the bag. She does this three times. What is the probability Keisha selects a red marble, then a green marble, and then a blue or orange marble?

A. $\dfrac{3}{500}$ | *probability of red $\times$ probability of green $\times$ probability of blue*

B. $\dfrac{7}{500}$ *

C. $\dfrac{7}{108}$ | *calculates probabilities as color divided by not color: (25/225)(50/200)(175/75) = (1/9)(1/4)(7/3) = (0.25)(7/27)*

D. $\dfrac{4}{25}$ | *correct set-up for (1/10)(1/5)(7/10), but then adds 1/10 and 7/10 instead of multiplying*

D-S.3.2.3
D-S.3.2.2

45. Carla uses a special 12-sided number polyhedron for some experiments. Some information about the polyhedron is listed below.

- There is a $\frac{1}{3}$ probability that Carla will roll a number that is a multiple of 3.

- There is a $\frac{5}{12}$ probability that Carla will roll a prime number.

Carla rolls her 12-sided number polyhedron two times. What is the probability that Carla rolls a multiple of 3 on her first roll, and a number that is **not** a prime number on her second roll?

A. $\frac{5}{36}$ | $1/3 \times 5/12$

B. $\frac{7}{36}$ *

C. $\frac{5}{18}$ | $2/3 \times 5/12$

D. $\frac{7}{18}$ | $2/3 \times 7/12$

FIRST OPEN-ENDED QUESTION

A-N.1.1

46. Jordan needs to determine the value of the expression below.

$$1.75 + \left(-2\frac{1}{2}\right)$$

A. Use the number line provided below to create a number line model of the expression that can be used to determine the value of the expression. Explain how the model can be used.
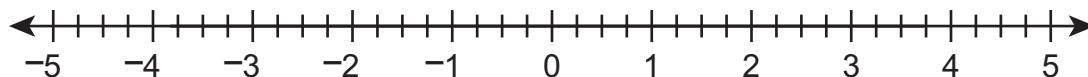
B. Determine the value of the expression.

Go to the next page to finish question 46.

46. *Continued.* Please refer to the previous page for task explanation.

Cindy is using *x* and *y* to represent two rational numbers. She writes the two expressions below using *x* and *y*.

$$x - y \qquad x + y$$

Cindy correctly locates the value of each expression on the number line shown below.
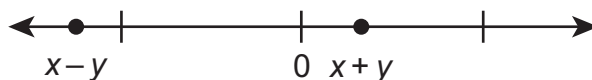
C. Explain why *x* must represent a negative rational number and *y* must represent a positive rational number.

ITEM-SPECIFIC SCORING GUIDELINE

Question #46

Grade 7

Assessment Anchor this item will be reported under:

> M07.A-N.1—Apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.

Specific Anchor Descriptor addressed by this item:

> M07.A-N.1.1—Solve real-world and mathematical problems involving the four operations with rational numbers.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of how to apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of how to apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of how to apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of how to apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.
Non-Scorables	B – Blank R – Refusal K – Off task/topic F – Foreign language U – Illegible

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 – 1.5 points. OR Student demonstrates minimal understanding of how to apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Question #46

Top Scoring Response:

Part A Answer	
What?	**Why?**
	Sample Explanation: First, 1.75 is modeled on the number line by drawing an arrow starting at 0 and moving to the right 1.75 units. Since the number that is being added to 1.75 is negative, the next arrow needs to be drawn starting at 1.75 and moving left 2½ units. **OR equivalent**

(2 score points)

      1 point for correct model
      1 point for complete explanation
          OR ½ point for correct but incomplete explanation

Part B Answer	
What?	**Why?**
⁻0.75	

(1 score point)

      1 point for correct answer

Part C Answer	
What?	**Why?**
	Sample Explanation: Since x is the number midway between $x - y$ and $x + y$, it would be located to the left of 0. This means $x < 0$, so x is negative. From the number line, $x + y$ is located to the right of 0, so $x + y$ must be positive. Since x is negative, the only way $x + y$ can be positive is if y is positive. If y is negative, then $x + y$ would be negative since adding two negative numbers always results in a negative number. So, x represents a negative rational number, and y represents a positive rational number. **OR equivalent**

(1 score point)

      1 point for complete explanation
          OR ½ point for correct but incomplete explanation

SECOND OPEN-ENDED QUESTION

A-R.1.1.4
A-R.1.1.6

47. Valery and Manuel ride their bikes 40 miles every Saturday. Valery rides at an average speed of 9.6 miles per hour (mph).

> **A. Exactly** how many hours does it take Valery to ride her bike 40 miles? Show or explain all your work.

Go to the next page to finish question 47.

47. *Continued.* Please refer to the previous page for task explanation.

Manuel's bike ride is represented by the graph shown below.

Manuel's Bike Ride
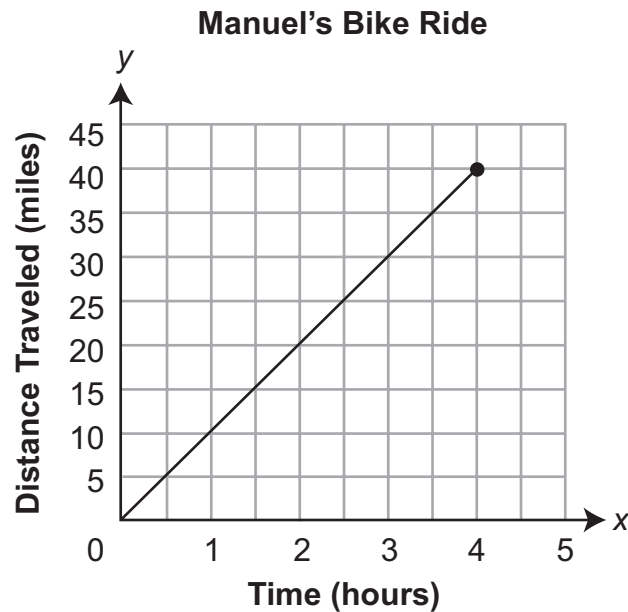
Valery increases her speed by 4% the next time she rides her bike so she can ride faster than Manuel.

B. Explain why the 4% increase is **not** enough for Valery to ride faster than Manuel. As part of your explanation, find how many fewer miles Valery rides than Manuel does when he finishes his 40-mile bike ride.

ITEM-SPECIFIC SCORING GUIDELINE

Question #47

Grade 7

Assessment Anchor this item will be reported under:

M07.A-R.1—Demonstrate an understanding of proportional relationships.

Specific Anchor Descriptor addressed by this item:

M07.A-R.1.1—Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of proportional relationships by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of proportional relationships by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of proportional relationships by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of proportional relationships.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.
Non-Scorables	B – Blank R – Refusal K – Off task/topic F – Foreign language U – Illegible

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 – 1.5 points. OR Student demonstrates minimal understanding of proportional relationships.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Question #47

Top Scoring Response:

Part A Answer	
What?	**Why?**
4.1666… hours **OR** $4\frac{1}{6}$ hours **OR** 4 hours and 10 minutes **OR** $4.1\overline{6}$	**Sample Work:** $40 \div 9.6 = h$ $4.1666… = h$ **OR** **Sample Explanation:** Since Valery rode at an average speed of 9.6 miles per hour and she rode a distance of 40 miles, the total time it took her can be found by dividing 40 by 9.6. So it took her $4\frac{1}{6}$ hours. **OR equivalent**

(2 score points)

   1 point for correct answer
   1 point for complete support
        OR ½ point for correct but incomplete support

Part B Answer	
What?	**Why?**
0.064 (mile)	**Sample Explanation:** If Valery increases her speed by 4%, her new speed will be $9.6 \times 1.04 = 9.984$ mph. Manuel's speed from the graph is 10 mph. Since $9.984 < 10$, she will not be faster than Manuel. It takes Manuel 4 hours to finish the ride, so Valery will only have finished $9.984 \times 4 = 39.936$ miles. This means she will have ridden 0.064 miles less than Manuel when he finished the 40-mile bike ride. **OR equivalent**

(2 score points)

   1 point for correct answer
   1 point for complete explanation
        OR ½ point for correct but incomplete explanation

THIRD OPEN-ENDED QUESTION

B-E.1.1.1
C-G.2.2

48. Shawn designs a rectangular garden as shown below. He will design both rock sections to have the same width (x).

Shawn's Garden

15 feet

rocks	x feet
flowers	7 feet
rocks	x feet
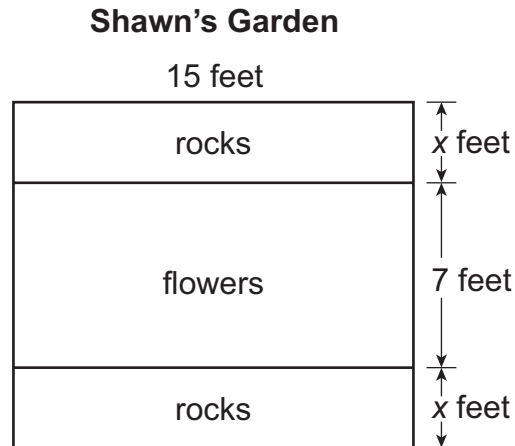
The expression shown below represents the perimeter, in feet, of Shawn's garden.

$$15 + 2x + 7 + 15 + 2x + 7$$

A. Use exactly two terms to write an equivalent expression to represent the perimeter, in feet, of Shawn's garden.

Go to the next page to finish question 48.

48. *Continued.* Please refer to the previous page for task explanation.

The area, in square feet, of Shawn's garden is found by calculating $15(2x + 7)$. Shawn incorrectly says the area can also be found using the expression $30x + 7$.

B. Describe the error in Shawn's expression. As part of your explanation, find the difference, in square feet, between the actual area of Shawn's garden and the area found using his expression.

Charlie designs a square garden. Each side length is $3x + 5$.

C. The perimeter of Charlie's garden is how much larger than the perimeter of Shawn's garden?

ITEM-SPECIFIC SCORING GUIDELINE

Question #48

Grade 7

Assessment Anchor this item will be reported under:

> M07.B-E.1—Represent expressions in equivalent forms.

Specific Anchor Descriptor addressed by this item:

> M07.B-E.1.1—Use properties of operations to generate equivalent expressions.
> M07.C-G.2.2—Determine circumference, area, surface area, and volume.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of how to represent expressions in equivalent forms by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of how to represent expressions in equivalent forms by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of how to represent expressions in equivalent forms by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of how to represent expressions in equivalent forms.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.
Non-Scorables	B – Blank R – Refusal K – Off task/topic F – Foreign language U – Illegible

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 – 1.5 points. OR Student demonstrates minimal understanding of how to represent expressions in equivalent forms.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Question #48

Top Scoring Response:

Part A Answer	
What?	**Why?**
4x + 44 (feet) **OR** 44 + 4x (feet)	

(1 score point)

> 1 point for correct answer

Part B Answer	
What?	**Why?**
98 (square feet)	**Sample Support:** Shawn only distributed the 15 to the first term (2x) and not to the second term (7). Since the actual area should be 30x + 105, the difference is (30x + 105) − (30x + 7) = 98 square feet. **OR equivalent**

(2 score points)

> 1 point for correct answer
> 1 point for correct and complete support

Part C Answer	
What?	**Why?**
8x − 24 **OR equivalent**	

(1 score point)

> 1 point for correct answer

FOURTH OPEN-ENDED QUESTION

C-G.2.2.2
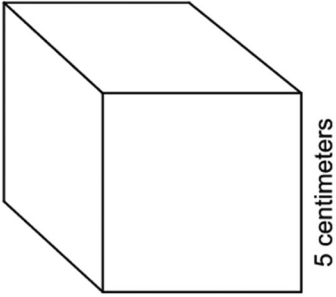
Question 49
Page 1 of 2

Justin has a wooden cube. Each edge of the cube is 5 centimeters long, as shown below.

5 centimeters

Justin paints every face of the wooden cube.

A. What is the total surface area, in square centimeters, of the cube Justin paints?

After the paint dries, Justin cuts the cube in half. He makes the cut along the diagonal of one pair of parallel faces. Rounded to the nearest thousandth, the diagonal has a length of 7.071 centimeters. Once the cut is made, Justin has two identical triangular prisms.

B. What is the combined area, in square centimeters, of the surfaces of the two prisms that were **not** painted?

Justin has a wooden cube. Each edge of the cube is 5 centimeters long, as shown below.

5 centimeters

Justin has a second wooden cube identical to the first. He cuts off the triangular prism as shown below and throws it away.

2.5 centimeters

2.5 centimeters

2.5 centimeters
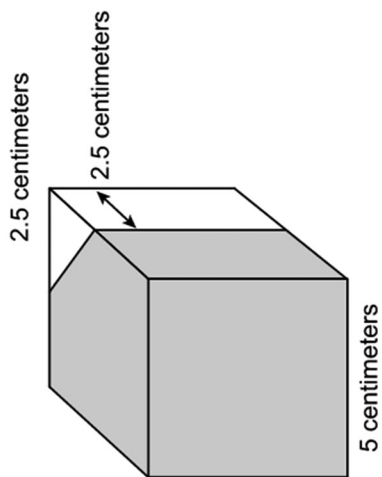
5 centimeters

C. What is the volume, in cubic centimeters, of the remaining solid? Show or explain all your work.

0 / 1000

Back

Options   Flag   Pause   Review/End Test

ITEM-SPECIFIC SCORING GUIDELINE

Question #49

Grade 7

Assessment Anchor this item will be reported under:

> M07.C-G.2—Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume.

Specific Anchor Descriptor addressed by this item:

> M07.C-G.2.2—Determine circumference, area, surface area, and volume.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of problems involving area and surface area by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of problems involving area and surface area by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of problems involving area and surface area by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of problems involving area and surface area.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.
Non-Scorables	B – Blank R – Refusal K – Off task/topic F – Foreign language U – Illegible

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 – 1.5 points. OR Student demonstrates minimal understanding of problems involving area and surface area.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Question #49

Top Scoring Response:

Part A Answer	
What?	**Why?**
150 (square centimeters)	

(1 score point)

      1 point for correct answer

Part B Answer	
What?	**Why?**
70.710 (square centimeters) **OR** 70.71 (square centimeters)	

(1 score point)

      1 point for correct answer

Part C Answer	
What?	**Why?**

$109\dfrac{3}{8}$
   OR
109.375
	Sample Work:
	$5^3 = 125$
	$\dfrac{1}{2}(2\dfrac{1}{2})(2\dfrac{1}{2})(5) = 15\dfrac{5}{8}$
	$125 - 15\dfrac{5}{8} = 109\dfrac{3}{8}$
	   OR
	Sample Explanation:
	The volume of the remaining part can be found by subtracting the volume of the triangular prism from the volume of the cube. The volume of the cube is (5)(5)(5) = 125 cubic cm. The volume of the triangular prism is 0.5(2.5)(2.5)(5) = 15.625 cubic inches. So the volume of the remaining part is 125 – 15.625 = 109.375 cubic cm.
	   OR equivalent

(2 score points)

      1 point for correct answer
      1 point for complete support

FIFTH OPEN-ENDED QUESTION

D-S.2.1

D-S.1.1

Question 50
Page 1 of 2

Kalil surveyed 13 classmates to find out the number of days it had been since the last time they were at a grocery store. The results are shown in the line plot below.

Days since Being at a Grocery Store

```
  ×
  ×       ×
  ×   ×   ×   ×
  ×   ×   ×   ×   ×
× ×   ×   ×   ×   ×
× × +---+---+---+---+---+---+---+---+---+---+--->
  0 1 2 3 4 5 6 7 8 9 10
          Number of Days
```

A. What is the **median** number of days represented on Kalil's line plot?

[EQ] [   ]

B. What is the **interquartile range** of the number of days represented on Kalil's line plot?

[EQ] [   ]

Kalil surveyed 13 classmates to find out the number of days it had been since the last time they were at a grocery store. The results are shown in the line plot below.

Days since Being at a Grocery Store

```
 x
 x   x
 x   x   x
 x   x   x       x
 x   x   x   x   x
 +---+---+---+---+---+---+---+---+---+---+---+
 0   1   2   3   4   5   6   7   8   9   10
              Number of Days
```

Two days later, Kalil surveyed the same 13 classmates and found that none of them had been to a grocery store since he last surveyed them.

C. By how much does the **mean** of Kalil's second data set change in comparison with the **mean** of the data set in his original survey? Explain how to determine the change in the means **without** calculating the mean of either data set.

EQ

0 / 1000

D. Explain why the **mean absolute deviations** of both data sets are the same **without** calculating the mean absolute deviation of either data set.

EQ

0 / 1000

Back

Review/End Test   Pause   Flag   Options

ITEM-SPECIFIC SCORING GUIDELINE

Question #50

Grade 7

Assessment Anchor this item will be reported under:

> M07.D-S.2—Draw comparative inferences about populations.

Specific Anchor Descriptor addressed by this item:

> M07.D-S.2.1—Use statistical measures to compare two numerical data distributions.
> M07.D-S.1.1—Use random samples.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of drawing comparative inferences about populations by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of drawing comparative inferences about populations by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of drawing comparative inferences about populations by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of drawing comparative inferences about populations.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.
Non-Scorables	B – Blank R – Refusal K – Off task/topic F – Foreign language U – Illegible

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 – 1.5 points. OR Student demonstrates minimal understanding of drawing comparative inferences about populations.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Question #50

Top Scoring Response:

Part A Answer	
What?	**Why?**
4 (days)	

(1 score point)

      1 point for correct answer

Part B Answer	
What?	**Why?**
3 (days)	

(1 score point)

      1 point for correct answer

Part C Answer	
What?	**Why?**

Sample Response:
The original mean is 2 less than the new mean.
    OR equivalent
	Sample Explanation:
	All the values in the new data set will be 2 greater than the values in the original data set. This will raise the sum of the data points by 26 and so raise the mean by 26 ÷ 13 = 2.
	    OR equivalent

(1 score point)

      ½ point for correct answer
      ½ point for correct and complete explanation

Part D Answer	
What?	**Why?**
	Sample Explanation: The mean absolute deviation measures how far data points are from the mean. Because the data points and the mean **all** moved up 2, the distance from the mean for each data point is the same. Therefore, the mean absolute deviation of both data sets is the same. **OR equivalent**

(1 score point)

      1 point for correct and complete explanation
          OR ½ point for correct but incomplete explanation