

1. Stan added the figures above. What does the “1” he wrote at the top of the second column mean?

$$\begin{array}{r} ^1 \\ 245 \\ 23 \\ + 19 \\ \hline 287 \end{array}$$

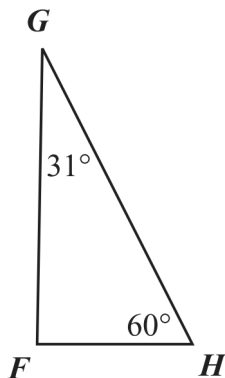
- A. ten regrouped B. one borrowed
C. remainder of one D. one more than 10
2. What is the solution to the equation?

$$\frac{-8(-4) + (-6)}{2} =$$

- A. -19 B. -13 C. 13 D. 19
3. The floor in Steve’s room is shaped like a rectangle.
- It has an area of 168 square feet.
 - It has a width of 12 feet.

What is the length of Steve’s room?

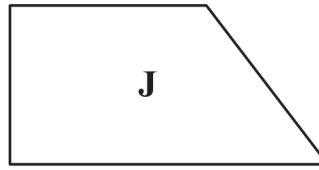
- A. 14 feet B. 28 feet
C. 72 feet D. 84 feet
4. Triangle FGH and two of its angle measures are shown below.



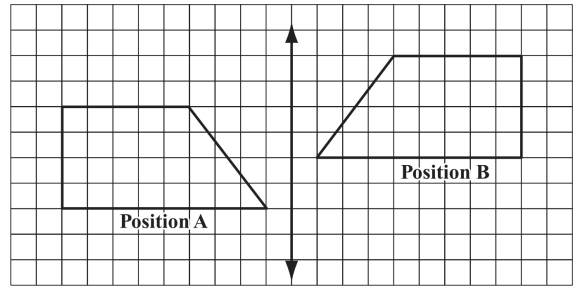
What is the measure of angle F ?

- A. 29° B. 89° C. 90° D. 91°

5. Use shape J to answer the following question



A shape was moved from Position A to Position B , as shown below.



Which of the following best describes how the shape was moved from Position A to Position B ?

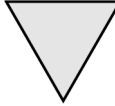
- A. flipped over the line, then slid up
B. flipped over the line, then slid down
C. flipped over the line, then turned 90° clockwise
D. flipped over the line, then turned 90° counterclockwise
6. The distance to the beach is fifty miles more than twice the distance to the mountains. If d represents the distance to the mountains, which expression represents the distance to the beach?
- A. $50d$ B. $2d + 50$
C. $50d + 2$ D. $100d + 50$
7. What is the solution of the equation $e^x e^{2x} = 4$?

- A. $x = \sqrt{\frac{\ln 4}{2}}$ B. $x = \frac{4}{3e}$
C. $x = \ln\left(\frac{4}{3}\right)$ D. $x = \frac{\ln 4}{3}$

8. The shapes of some common traffic signs are shown below. Which of the following shapes does not have rotational symmetry?

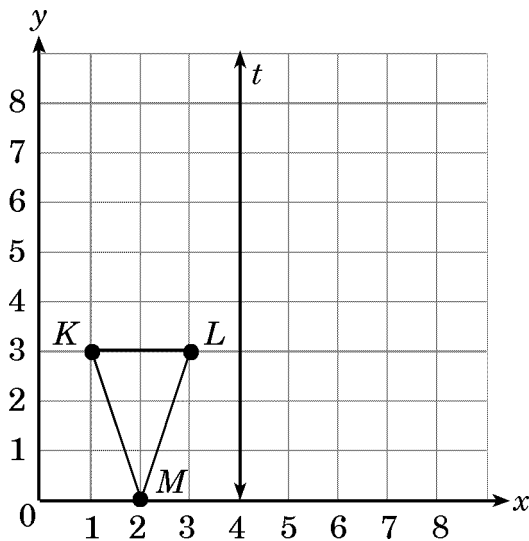
A.  Regular Octagon

B.  Square

C.  Equilateral Triangle

D.  Pentagon

9. The vertices of $\triangle KLM$ are $K(1, 3)$, $L(3, 3)$, and $M(2, 0)$.

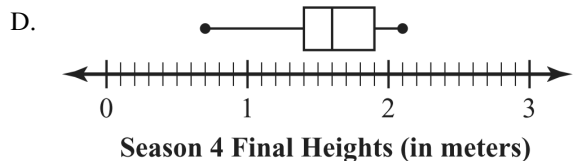
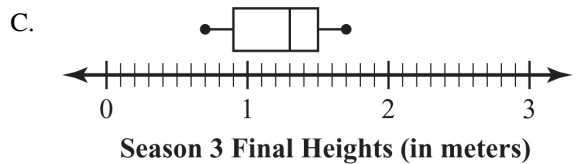
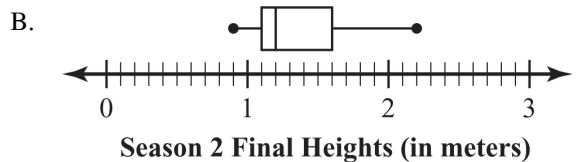
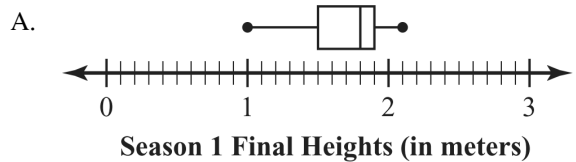


What are the coordinates of $\triangle K'L'M'$ when $\triangle KLM$ is reflected over line t ?

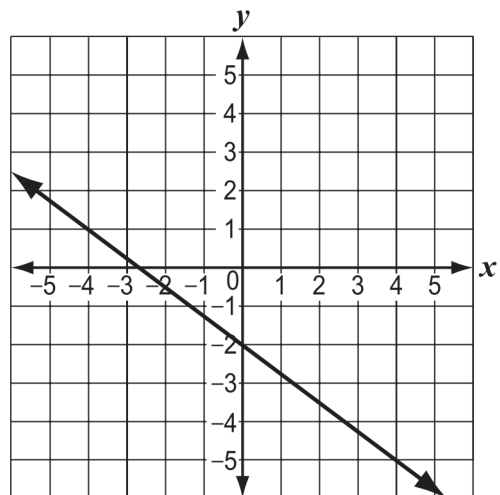
- A. $K'(5, 3)$, $L'(3, 3)$, $M'(6, 0)$
 B. $K'(7, 3)$, $L'(5, 3)$, $M'(6, 0)$
 C. $K'(7, 3)$, $L'(3, 6)$, $M'(6, 0)$
 D. $K'(1, 3)$, $L'(3, 3)$, $M'(7, 0)$

10. A researcher collected data on the final heights of corn plants. The data were collected from one farm over four growing seasons. He drew box-and-whisker plots to represent the data he collected for each growing season.

Which of the following box-and-whisker plots shows the *greatest* median final height?



11. Which of the following best represents the slope of the line graphed below?



- A. $-\frac{4}{3}$ B. $-\frac{3}{4}$ C. $\frac{3}{4}$ D. $\frac{4}{3}$

12. **Milk Prices**

The dairy section of the local supermarket sells milk in half-pint (8 oz.), pint (16 oz.), quart (32 oz.) and half-gallon (64 oz.) containers.

Container Size	Price
Half-pint	\$0.49
Pint	\$0.79
Quart	\$1.39
Half-gallon	\$1.99

The equation of a line that approximates the relationship in the graph is:

$$P = .03N + .31$$

Where P = the price of milk and N = the number of ounces in the container.

- Explain the meaning of the .03 in the equation.
- Explain the meaning of the .31 in the equation.

13. A jewelry store displays some of the items it sells in a 3 by 6 rectangular display box. The store owner wants to display several of each of the following items that the store sells:

- Gold bracelets (G) that cost \$8 each
- Silver necklaces (S) that cost \$6 each
- Copper pins (C) that cost \$9 each
- Pairs of wire earrings (E) that cost \$4 each pair

The display must meet the following conditions:

- There are at least two of each item;
- The total cost of the items in the display is more than \$120; and
- No two display boxes that share a side can have the same item.

Show how the jewelry can be displayed in the 18 display boxes and show the total cost of the items in the display.

TOTAL COST OF THE ITEMS DISPLAYED

14. Ms. York gave a math quiz to each of her two classes. The quiz scores of each class are shown below.

Morning Class Quiz Scores

Afternoon Class Quiz Scores

Quiz Scores	91, 80, 75, 80, 60, 87, 80, 88, 90, 87, 92, 98	80, 87, 90, 70, 93, 80, 85, 90, 95, 80
Mean	84	?
Median	87	?
Mode	80	?

- Draw a stem-and-leaf plot that displays the afternoon class quiz scores. Make sure to include a key.
- Determine the mean, median, and mode of the quiz scores for the afternoon class. Show or explain your work.
- Which class do you think did better on the quiz? Show or explain your work.
- If Ms. York wants to compute the overall mean of the scores from both classes, can she do this by taking the average of both means? Explain why or why not.





15. Ms. Larson gave a mathematics test to nine of the students in her class. Each student's score is listed in the box below.


85, 77, 88, 52, 82, 95, 93, 77, 80

- Make a stem-and-leaf plot for these test scores. Be sure to include a key.
- What is the median of these test scores? Show or explain how you got your answer.
- The test score of one more student was added to the list. With the new score included, the median is 83. What score was added to the list? Show or explain how you got your answer.

16. Look at this pictograph.

Dogs at the Park

Type of Dog	Number of Dogs
Beagle	
Collie	
Poodle	
Dalmatian	

Key
 represents 1 dog

- Write a word problem that can be answered using the information in this pictograph.
- Answer the word problem you wrote.

17. Rita wrote the number pattern shown below.

57, 53, 49, 45, 41

- What could be the rule for Rita's pattern?
- Use the rule you wrote in part (a) to write the next number in Rita's pattern.

57, 53, 49, 45, 41, _____

18. Russell hits a golf ball, the path of which can be approximated by the equation shown below.

$$y = -\frac{1}{400}(x - 140)^2 + 49$$

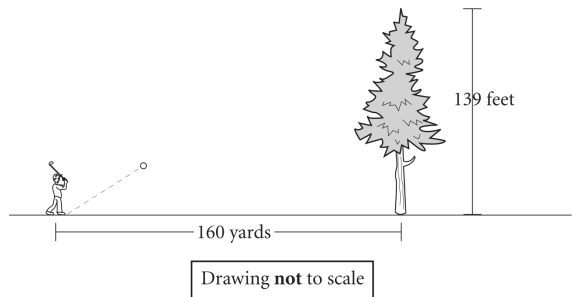
y = height of the ball, in yards
 x = horizontal distance, in yards

Part A Find the height of the ball after it has traveled a horizontal distance of 100 yards. In the space below, show your work and write your answer on the line.

Height _____ yards

Part B What do the x -intercepts represent in the context of the problem? On the lines below, explain your reasoning.

Part C Study the diagram below. The diagram shows a tree at a horizontal distance of 160 yards from the starting point of the ball. The tree is 139 feet tall.



By how many feet will the ball clear the tree? In the space below, show your work and write your answer on the line.

_____ feet

19. The newsstand price of a magazine is discounted 28% for subscribers. The newsstand price is \$5.00. What is the subscription price?

A. \$1.40 B. \$3.60 C. \$4.72 D. \$5.28

20. Tim bought 2 paintbrushes that each cost \$2.55. He also bought 1 bucket that cost \$1.60. How much did Tim pay in all?

A. \$3.50 B. \$4.15 C. \$6.15 D. \$6.70

21. What is 6050.287 rounded to the nearest ten?

- A. 6050 B. 6100
 C. 6050.29 D. 6050.3

22. Nancy spends \$1.50. What is her change from \$5.00?

- A. \$4.50 B. \$4.00 C. \$3.50 D. \$2.50

23. Create a number with:

a 3 in the tens place.

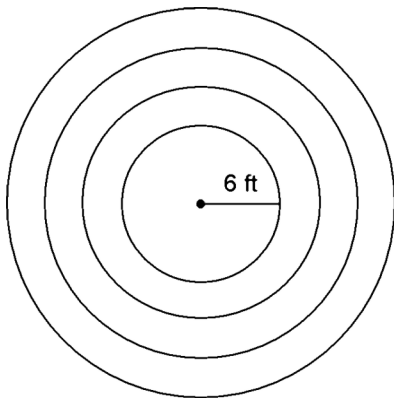
a 7 in the hundredths place, and

a 4 in the ten-thousands place.

Write numbers in the boxes to create the number.

, .

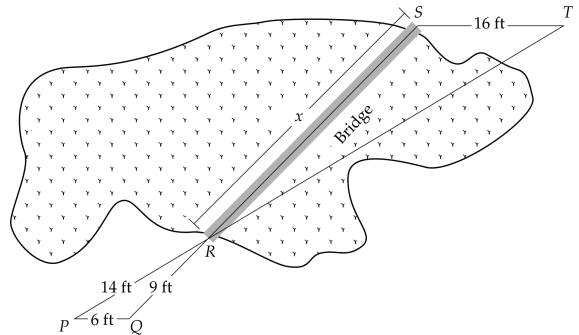
24.



Cris's family took a trip to visit the new local gardens. While there they saw an unusual circular design created from different stones found around the state. The drawing shown illustrates the design. There are 3 feet between each ring of stones. What is the diameter of the entire circular design?

- A. 15 feet B. 21 feet
 C. 27 feet D. 30 feet

25. A contractor is designing a bridge to go over the lake. The contractor will use the measurements shown below to calculate the length of the bridge. \overline{ST} is parallel to \overline{PQ} .



Note: The figure is not drawn to scale.

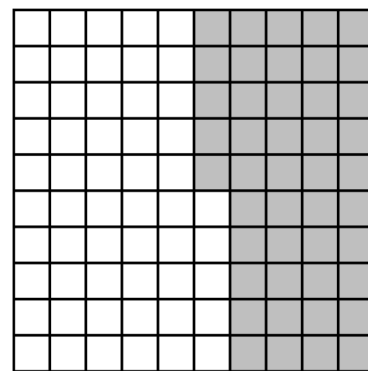
What is the length (x) of the bridge? Round the answer to the nearest foot.

- A. 10 feet B. 11 feet
 C. 24 feet D. 38 feet

26. Kyle and Becky were selling candy bars for the student council fundraiser. Kyle sold twice as many candy bars as Becky. If Becky sold x number of candy bars, which expression shows the total number of candy bars Kyle and Becky sold?

- A. x^2 B. $x + 2$ C. $x + 2x$ D. $x + x$

27. A decimal number is shown on a grid.



Which number is less than the number shown on the grid?

- A. 0.9 B. 0.48 C. 0.450 D. 0.275

28. Which number makes this number sentence true?

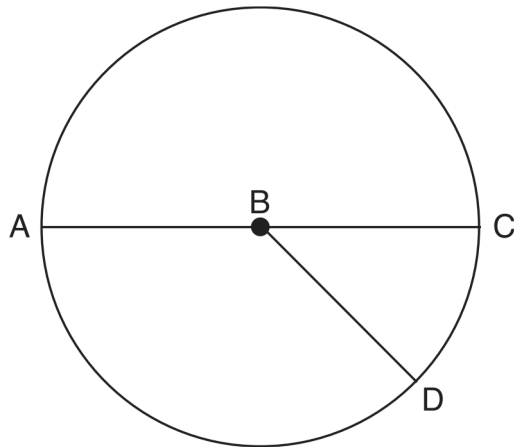
$$7 + \boxed{?} = 32$$

- A. 15 B. 25 C. 39

29. Which of the following would best be measured using square centimeters?

- A. the length of a bee
 B. the weight of an ant
 C. the area of a book cover
 D. the volume of water in a swimming pool

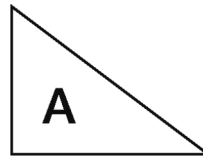
30. A circle is shown.



Which statement about the circle is true?

- A. The diameter is \overline{AB} .
 B. The diameter is \overline{AC} .
 C. The only radius is \overline{BD} .
 D. The radius is two times the length of \overline{BC} .

31. Daniel drew triangle A.



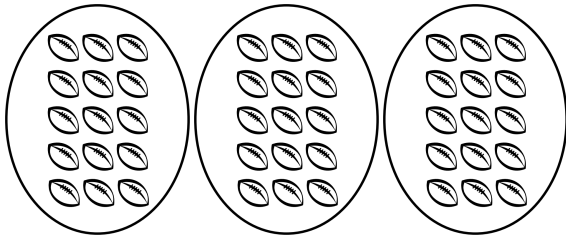
He did a slide and a flip across its shortest edge to make triangle B. Which is the correct picture?

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

32. In the year 2000, the population of Tupelo, Mississippi, was 34,211. What is another way to write 34,211?

- A. $30,000 + 4,000 + 200 + 10 + 1$
 B. $30,000 + 4,000 + 210 + 11$
 C. $30,000 + 4,000 + 2,000 + 10 + 1$
 D. $34,000 + 40,000 + 200 + 10 + 1$

33. Which expression shows the multiplication needed to calculate the total number of footballs?



- A. 5×5 B. 3×15 C. 3×5 D. 3×3

34. Juana ate $\frac{3}{8}$ of a pizza, and Nick ate $\frac{4}{8}$ of the same pizza. They used the expression $\frac{3}{8} + \frac{4}{8}$ to represent how much pizza they ate.

What fraction of the pizza did Juana and Nick eat?

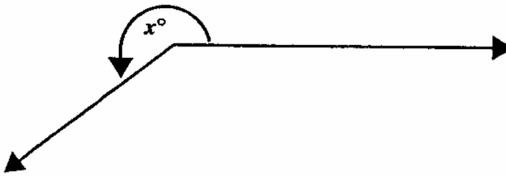
- A. $\frac{1}{8}$ B. $\frac{3}{8}$ C. $\frac{5}{8}$ D. $\frac{7}{8}$

35. A carpenter cuts 6 feet 6 inches from a board that is 8 feet 2 inches long.

What is the length of the board after the cut?

- A. 1 feet 8 inches B. 2 feet 8 inches
C. 1 feet 4 inches D. 3 feet 4 inches

36. In the figure below, what is the *best* estimate of the value of x ?

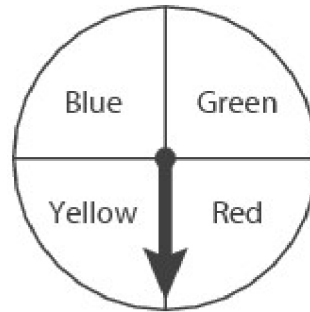


- A. 150 B. 175 C. 210 D. 270

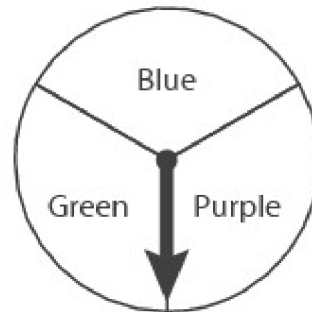
37. Each of the spinners below will be spun one time.

On which spinner is the arrow *most likely* to land on a space marked Blue?

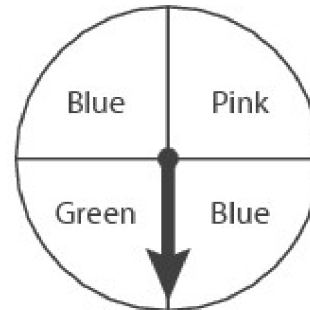
A.



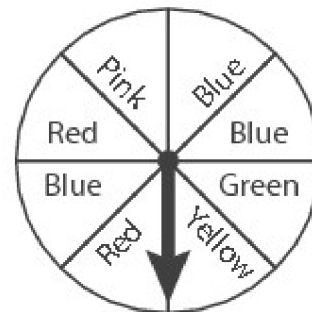
B.



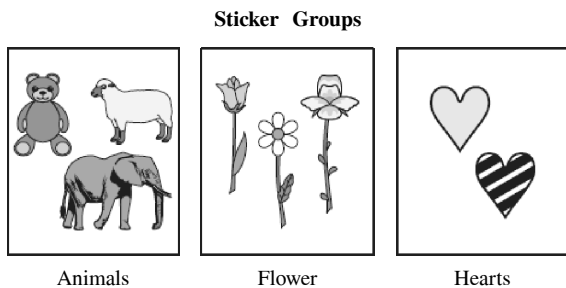
C.



D.

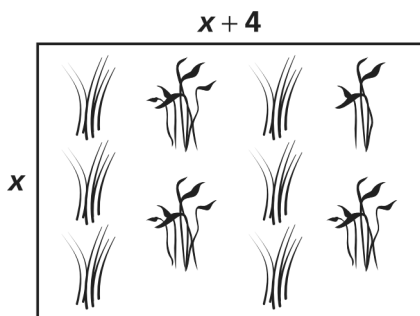


38. Shannon wants to decorate her folder with stickers. She decided to choose 1 animal, 1 flower, and 1 heart from each of the sticker groups shown below.



What is the total number of different combinations of 1 animal, 1 flower, and 1 heart that Shannon can choose?

- A. 8 B. 9 C. 11 D. 18
39. What is the equation of the line that contains the point (4, 5) and is parallel to $y = -\frac{2}{3}x + \frac{7}{3}$?
- A. $y = \frac{3}{2}x - \frac{23}{3}$ B. $y = -\frac{3}{2}x + \frac{23}{3}$
- C. $y = -\frac{2}{3}x + \frac{23}{3}$ D. $y = \frac{2}{3}x - \frac{23}{3}$
40. Ivan placed a fence around his rectangular vegetable garden. The perimeter of the garden was 48 feet. The equation $2x + 2(x + 4) = 48$ can be used to determine the dimensions of the garden.



What is the width, x , of Ivan's garden?

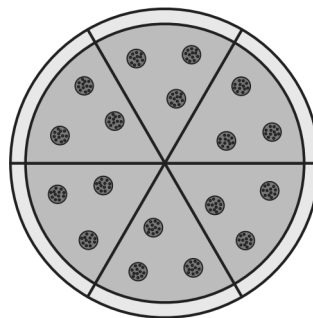
- A. 10 feet B. 11 feet
 C. 14 feet D. 22 feet

41. Which is the greatest common factor of the expression below?

$$32a^3b^2 + 36a^2c^2 - 16ab^3$$

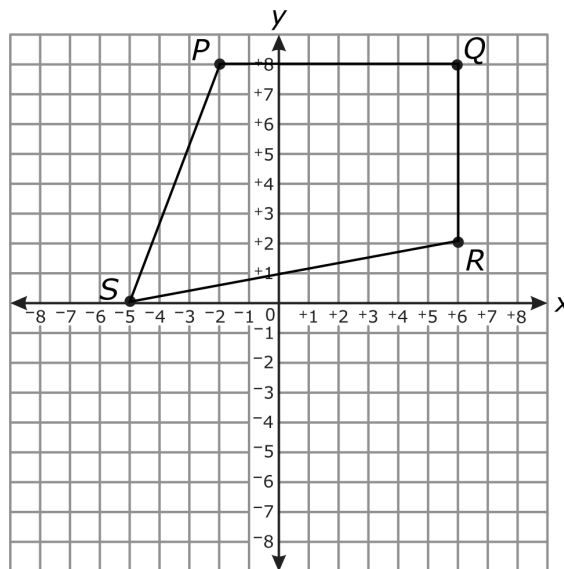
- A. $4a$ B. $4a^3b^2c^3$
 C. $6abc$ D. $8a^2b^2$

42. Jennifer cut a pizza into 6 equal slices.



Jennifer will eat 3 slices. What fraction of the pizza will Jennifer eat?

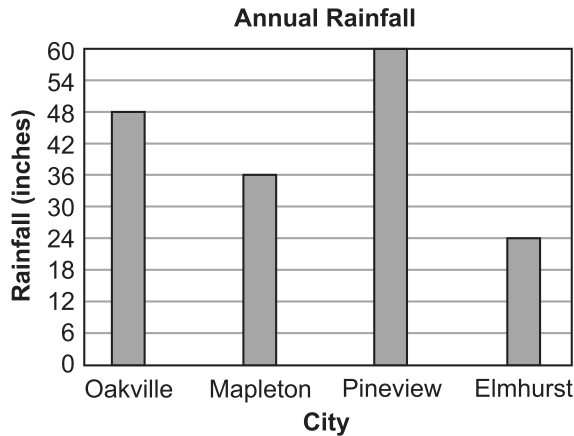
- A. $\frac{1}{6}$ B. $\frac{2}{6}$ C. $\frac{3}{6}$
43. Quadrilateral $PQRS$ is graphed in the coordinate plane.



To the nearest tenth, what is the perimeter of quadrilateral $PQRS$?

- A. 33.0 units B. 33.7 units
 C. 37.6 units D. 48.0 units

44. The bar graph below shows the annual rainfalls, in inches, of four cities.



What is the difference, in feet, of the rainfalls of the city with the greatest rainfall and the city with the least rainfall?

- A. 2 feet B. 3 feet
 C. 7 feet D. 36 feet
45. The six 5th grade classrooms have a total of 27 boxes of pencils. How many boxes will each classroom receive?
46. Rachel put some buttons into a bag. All of the buttons were the same size. The number of each color of button is shown in the table below.

Buttons in Bag

Color	Number
blue	3
green	7
purple	9
red	2

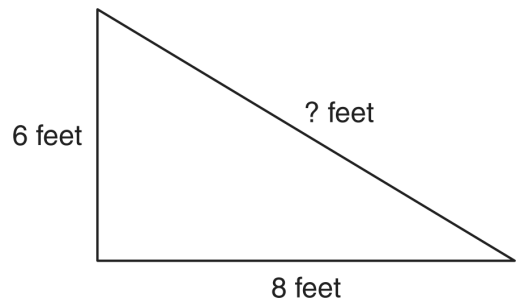
Rachel will reach into the bag and pull out a button without looking. What color button is Rachel *least* likely to pull out?

- A. blue B. green C. purple D. red
47. Solve the system of equations: $x - 2y + 3z = 5$, $x + 3z = 11$, $5y - 6z = 9$

48. For items a. through e. below, select the two equations with equivalent zeros.

- a. $y = x^2 + 14$
 b. $y = x^2 + 9x + 14$
 c. $y = (x - \frac{9}{2})^2 - \frac{25}{4}$
 d. $y = (x + 7)(x + 2)$
 e. $y = (\frac{1}{2}x + 7)(2x + 2)$

49. Look at this triangle.



The perimeter of the triangle is 24 feet. What is the length of the third side?

_____ feet

50. Write the number that makes this sentence true.

$$10 - \underline{\quad} = 6$$

51. Kerri planted a bean plant.

- The bean plant was 14 centimeters tall when it was planted.
- Each week the plant grew by the same amount.
- After 8 weeks the plant was 26 centimeters tall.

How many centimeters did the plant grow each week?

52. Which expression is equivalent to $\frac{x^2 - 16}{x^2 - 9x + 20}$ for $x \neq 4$?

- A. $\frac{x+4}{x+5}$ B. $\frac{x+4}{x-5}$ C. $\frac{x-4}{x+5}$ D. $\frac{x-4}{x-5}$

In science class, some students dropped a basketball and allowed it to bounce. They measured and recorded the highest point of each bounce.

The students' data is shown in **Table 1** and the scatterplot. The first data point (n) represents the height of the ball the moment the students dropped it.

Table 1

Bounce Number n	Measured Height (Inches) $h(n)$
0	233
1	110
2	46.6
3	21

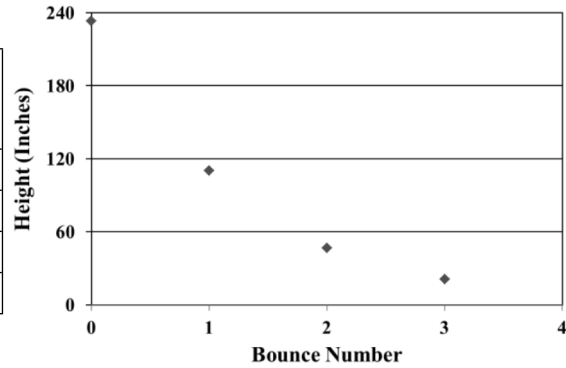


Table 2

Bounce Number n	Measured Height (Inches) $h(n)$	Factor by Which Bounce Height Decreased $h(n) \div h(n - 1)$
0	233	
1	110	
2	46.6	
3	21	

Table 3

Model 1	Model 2	Model 3	Model 4
$h(n) = a \cdot n + b$	$h(n) = a \cdot n^2 + b$	$h(n) = \frac{a}{n} + b$	$h(n) = a \cdot e^{bn}$

In this task you will choose a function to model the data and use the model to answer the following question(s).

53. a) Compute the first three values in the last column of **Table 2**
- b) Let n be the bounce number and $h(n)$ be the height. Consider the general forms for different kinds of models where a and b represent numbers in **Table 3** above.
- c) Which of the models shown is most appropriate to use for the given data?
- d) Given the data above, what are reasonable values for a and b if we want to create a specific model to fit the data? Write the appropriate values in the equation below.

(Based on the choice students make above, they are given the appropriate template below. Here is the template for the exponential model.)

$$h(n) = \underline{\hspace{2cm}} e^{\underline{\hspace{1cm}}n}$$

- e) Mika said,

The model I came up with is $h(n) = 233 \cdot e^{-0.8n}$. I used it to predict that after 50 bounces, the height of the bounces will be less than a thousandth of an inch. It is good to have the model because it would be very difficult to measure such small heights.

What is the best way to characterize Mika's claim?

1. Mika's claim is true. The whole point of using models is to make predictions.
2. Mika's claim is true, but she should give a more precise bound for the height of the ball after 50 bounces because the heights will be much, much smaller than one thousandth of an inch.
3. Mika is correct that the model predicts that the bounces will all be less than a thousandth of an inch, but in reality the ball will be at rest before it has bounced 50 times.
4. Mika is not using the model appropriately. Models cannot be used to make predictions past the given data, only between data points.
5. Mika is not using the model appropriately. The model does not fit the data very well, so it cannot be used to make predictions that far in the future.
6. Mika's claim is not true. The model states that the ball will be at rest before it gets to 50 bounces, so the bounce heights will be zero, which is easy to measure.