Session 1

1

There are 24 panes of glass in 8 windows.

Use the ratio to complete the table below.

Window Panes

Panes	Windows
3	
	3
	5
18	

2

Which expression is equivalent to y^4?

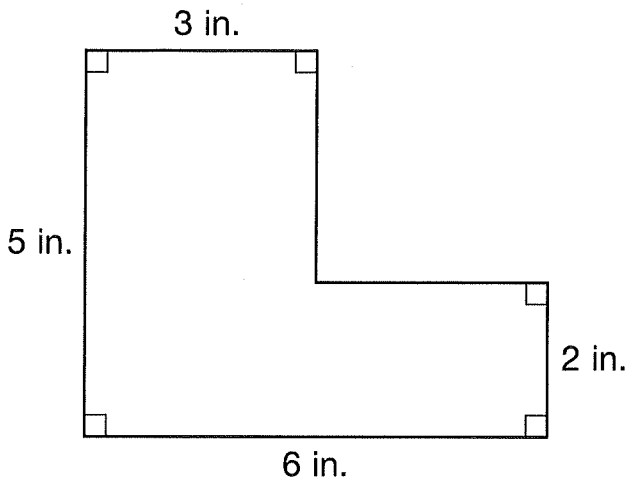
Ⓐ $y + y + y + y$

Ⓑ $4y$

Ⓒ $y^2 \times 2$

Ⓓ $y \times y \times y \times y$

A shape is shown below.



Place a check mark in the box next to each description of a decomposition that can be used to find the area, in square inches, of the shape.

A. ☐ Decompose the figure into a 5-by-3 rectangle and 2-by-6 rectangle.

B. ☐ Decompose the figure into a 5-by-3 rectangle and 2-by-3 rectangle.

C. ☐ Decompose the figure into a 3-by-3 rectangle and 2-by-6 rectangle.

D. ☐ Decompose the figure into a 3-by-2 rectangle and 3-by-6 rectangle.

E. ☐ Decompose the figure into a 3-by-4 rectangle and 2-by-4 rectangle.

4

Which of the following is a true statement?

Ⓐ All sets of data have a mode.

Ⓑ The range describes the spread of a set of data.

Ⓒ The interquartile range describes how data vary from the mode.

Ⓓ The mean absolute deviation describes how data vary from the mode.

5

A gull flew 60 feet above the ocean. A whale swam 240 feet below the ocean's surface. Place a check mark in the box next to each true statement.

A. ☐ The gull's elevation is 60 feet.

B. ☐ The whale's elevation is −240 feet.

C. ☐ The difference in the animals' elevations is 180 feet.

D. ☐ The ocean's surface has an elevation of 0 feet.

E. ☐ The gull is twice as close to the ocean's surface as the whale.

6

The ratio of girls to boys in a park is 4:3. Use the numbers from the item bank to complete the statement below.

1
3
4
7

For every ☐ boys, there are ☐ girls.

7

An expression is shown.

$18.04 - 7.2$

What is the value of the expression?

Ⓐ 10.84

Ⓑ 11.02

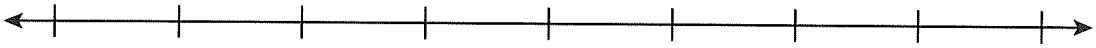
Ⓒ 11.84

Ⓓ 17.32

Federico recorded his math quiz scores during the sixth grade.

24, 20, 19, 22, 19, 23, 22, 17, 21, 21, 19, 21

Create a dot plot of Federico's data.

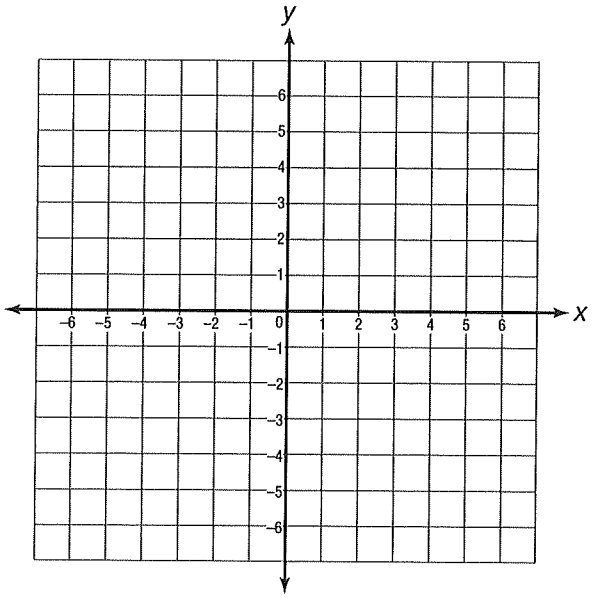


9

A set of points is shown below.

(−5, 2), (1, 2), (2, −2), (−4, −2)

Draw the polygon created by the points.



10

Place a check mark in the box next to each expression that is equivalent to 4^3.

A. ☐ 4×3

B. ☐ 8^2

C. ☐ $\left(\frac{1}{4}\right)^3$

D. ☐ $4 \times 4 \times 4$

E. ☐ $\left(\frac{4}{1}\right)^3$

F. ☐ 64^1

11

Four pizzas cost $72. If the pizzas are the same size and have the same toppings, how much does 1 pizza cost?

12

Place a check mark in the box next to each expression that is equivalent to 60 for the given value of y.

A. ☐ $(1 + y)^2 \times 3 - 10$ for $y = 4$

B. ☐ $100 - y^3 \times 5$ for $y = 2$

C. ☐ $4 \times y^2 - 4^3$ for $y = 6$

D. ☐ $15y + 6^2 - 7 \times 3$ for $y = 3$

E. ☐ $y(4 + 2^3)$ for $y = 5$

13

Roberta earns $9.25 per hour at a pizzeria. Write an equation that she can use to find *e*, her earnings, after *h* hours.

14

Which question has statistical variability?

Ⓐ Do you own a bike?

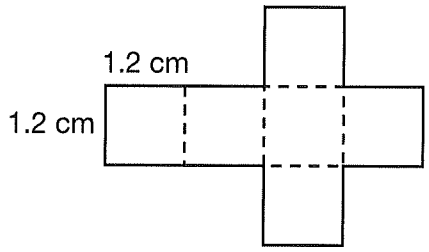
Ⓑ How many bikes are parked at the bike rack?

Ⓒ What are the distances of my classmates' bike rides to school?

Ⓓ How much did Andy's bike cost?

15

The net below represents a cube. What is the surface area of the cube?



Ⓐ 1.728 square centimeters

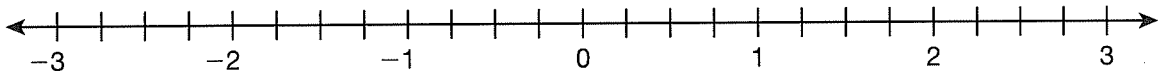
Ⓑ 5.76 square centimeters

Ⓒ 8.64 square centimeters

Ⓓ 16.8 square centimeters

16

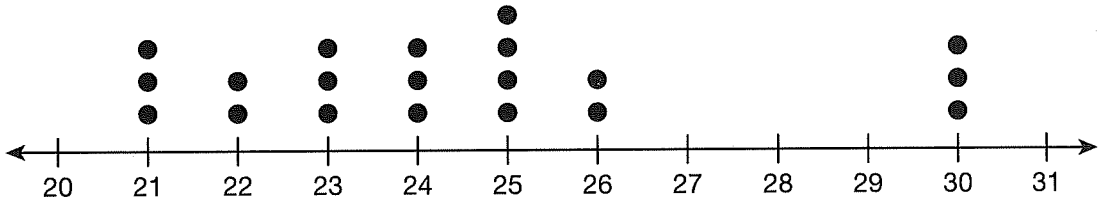
Plot a point on the number line below that is the opposite of $-1\frac{3}{4}$.



17

A luggage handler places each piece of luggage on a scale before a flight to Miami. The dot plot below shows the weights of the pieces of luggage.

Luggage Weighed by Handler



Weight (in pounds)

Place a check mark in the box next to each true statement.

A. ☐ The interquartile range of the data is 3.

B. ☐ The range of the data is 10.

C. ☐ The median of the data is 24.5.

D. ☐ The mode of the data is 25.

E. ☐ The mean of the data is 24.5.

18

A truck is painting traffic lines along a highway. The truck paints 8 miles of lines in 3 hours. At that rate, how many miles can the truck paint in 12 hours?

19

An expression is shown.

16,286 ÷ 34

What is the value of the expression?

Ⓐ 404

Ⓑ 409

Ⓒ 474

Ⓓ 479

20

Admission to a state fair is $10, and each ride ticket costs $2.50.

Write an expression to describe the total cost of 10 rides.

21

Peter graphed two points given below on a coordinate plane.

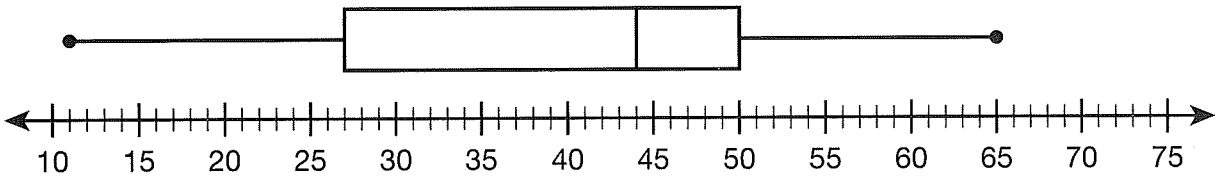
(−6, 4), (3, 4)

What is the distance between the points?

22

The box plot below shows the distances hiked by 40 members of a nature club in August.

Distances Hiked (in miles)



Place a check mark in the box next to each true statement about the data.

A. ☐ The range of the data is 54 miles.

B. ☐ The median is 44 miles.

C. ☐ Each quartile represents 40 members.

D. ☐ 10 members hiked between 11 and 27 miles in August.

E. ☐ The interquartile range is 25.

23

Place a check mark in the box next to each equation and/or inequality for which $x = 6$ is a solution.

A. ☐ $12 - 2x = 0$

B. ☐ $\frac{1}{2}x \times 4 = 8$

C. ☐ $3x \div 9 \geq 2$

D. ☐ $2.5x + 4 < 20$

E. ☐ $20 - \frac{1}{3}x = 14$

24

What is the greatest common factor of 54 and 72?

Ⓐ 8

Ⓑ 9

Ⓒ 12

Ⓓ 18

25

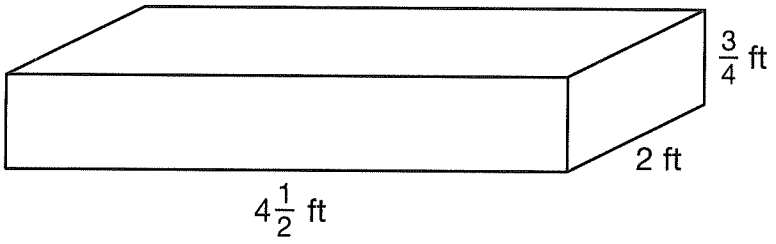
An equation is shown below.

$9g = 720$

What is the value for g that makes the equation true?

26

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



27

Which problem could be represented by the expression below?

$\frac{4}{5} \div \frac{1}{3}$

Ⓐ How many $\frac{1}{3}$-cup portions of raisins can be added to $\frac{4}{5}$ cup of cereal?

Ⓑ What is the difference between a $\frac{4}{5}$-foot board and a $\frac{1}{3}$-foot board?

Ⓒ How many $\frac{1}{3}$-pound hamburgers can be made with $\frac{4}{5}$ pound of meat?

Ⓓ How long is $\frac{1}{3}$ of a $\frac{4}{5}$-meter ribbon?

28

Place a check mark in the box next to each true statement.

A. ☐ -4 is located to the right of -5 on a number line.

B. ☐ 0 is located to the left of $2\frac{1}{4}$ on a number line.

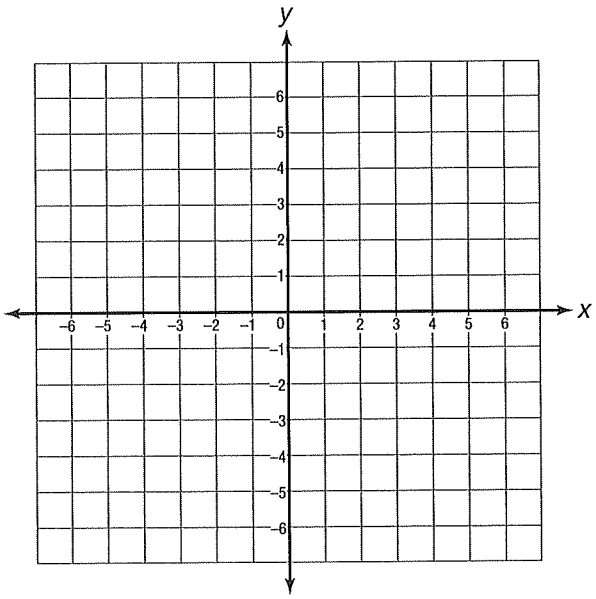
C. ☐ $-6\frac{1}{2}$ is located to the left of $-7\frac{1}{2}$ on a number line.

D. ☐ $2\frac{3}{4}$ is located to the right of -2 on a number line.

E. ☐ -1 is located to the left of -3 on a number line.

29

Mr. Campos plotted the points $(-3, 0)$ and $(-3, -2)$ on a coordinate plane. The points are vertices of a rectangle with an area of 14 square units. Draw a rectangle that could be Mr. Campos's rectangle.



30

Lawrence swims at least 24 laps each day. Which inequality shows l, the number of laps that Lawrence swims each day?

Ⓐ $l \geq 24$

Ⓑ $l \leq 24$

Ⓒ $l > 24$

Ⓓ $l < 24$

31

A cooking magazine has 6 soup recipes, 4 chicken recipes, 5 bread recipes, and 7 dessert recipes. Complete the table below by writing the ratios.

Comparison	Ratio
Soup recipes to bread recipes	
Chicken recipes to all recipes	
Bread and dessert recipes to chicken recipes	
Soup and bread recipes to chicken and dessert recipes	

32

What is the value of 2.1^2?

Ⓐ 0.441

Ⓑ 4.2

Ⓒ 4.41

Ⓓ 44.1

33

The table below shows the numbers of students in clubs at Livermore School.

Club	Number of Students
Chess	26
Garden	8
Spanish	13
French	6
Cooking	21
Photography	10
History	16
Hiking	8

Part A: What is the mean number of students at Livermore School?

Part B: What is the median number of students at Livermore School?

STOP

Session 2

34

Place a check mark in the box next to each statement that describes a unit rate.

A. ☐ Mr. Jones drove 1 hour.

B. ☐ Sally rode her bike 16 miles in 1 hour.

C. ☐ Ms. Gomez bought 1 pound of hamburger meat for $3.79.

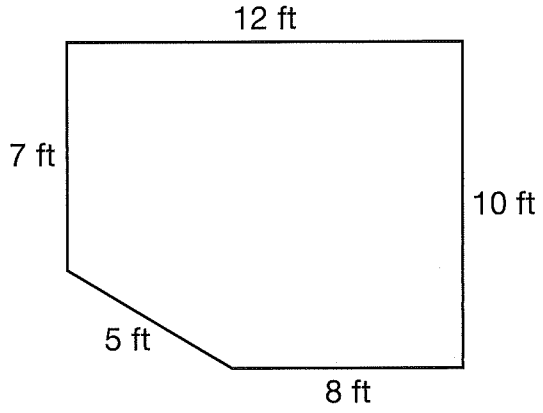
D. ☐ Lawrence bought $\frac{1}{4}$ pound of cheese for $5.25.

E. ☐ Mark ran 3 miles and then walked 1 mile.

F. ☐ A sign at a store says, "On sale now, 3 markers for $1!"

35

The Matsuis built a deck in their backyard.



Place a check mark in the box next to each description of a decomposition that can be used to find the area, in square feet, of the backyard.

A. ☐ Decompose the figure into a 7-by-10 rectangle, a 3-by-8 rectangle, and a triangle with height 3 and width 4.

B. ☐ Decompose the figure into a 10-by-8 rectangle, a 7-by-4 rectangle, and a triangle with height 3 and width 4.

C. ☐ Decompose the figure into a 7-by-12 rectangle, a 5-by-8 rectangle, and a triangle with height 3 and width 4.

D. ☐ Decompose the figure into a 7-by-12 rectangle and a trapezoid with height 5 and bases 12 and 8.

E. ☐ Decompose the figure into a 10-by-8 rectangle and a trapezoid with height 4 and bases 7 and 10.

36

The table below shows the points scored by Tina in her first four basketball games.

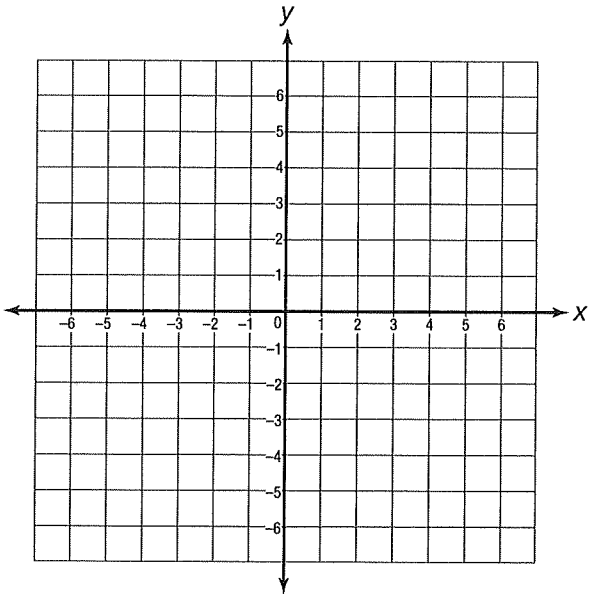
Game	1	2	3	4	5
Points Scored	8	4	13	11	

Tina's goal is to have a mean score greater than 10 points after the fifth game. What is the fewest number of points she needs to score to meet her goal?

37

Plot the points on the coordinate plane.

(3, −4), (−1, 1), (2, 0), (−5, −3)



38

A baker made 81 onion bagels one morning. The onion bagels were 45% of the bagels she made. How many bagels did the baker make?

39

Place a check mark in the box next to each statement that describes the expression $5 - 3c$.

A. ☐ The expression represents subtract 5 from the product of 3 and c.

B. ☐ The expression represents the difference of 5 and the product of 3 and c.

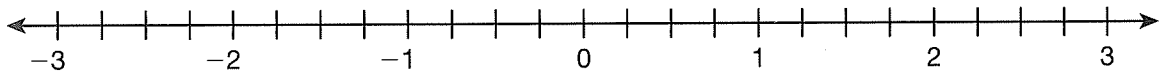
C. ☐ The expression represents 5 minus 3 times c.

D. ☐ The expression represents 5 times 3 minus c.

E. ☐ The expression represents the product of 3 and c less than 5.

40

Graph the inequality $x < 1\frac{1}{2}$.



41

An expression is shown.

$(5.3 + 20.9) \times 6.7$

What is the value of the expression?

Ⓐ 145.33

Ⓑ 165.44

Ⓒ 168.84

Ⓓ 175.54

42

There are 23 students in a sixth-grade class. Nine students play basketball. What is the ratio of students who do not play basketball to the students who do play basketball?

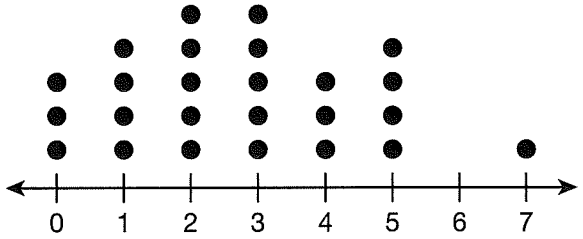
43

Natasha spends $9 for supplies to make necklaces that she sells for $2 each. Her profit is given by the expressioin $2n - 9$. What does the variable n represent?

44

The dot plot below shows how many days this week students in a sixth-grade class ate cereal for breakfast.

Cereal for Breakfast



Which statement about the data is true?

Ⓐ The range is 6.

Ⓑ The median is 2.

Ⓒ The mode is 2.

Ⓓ There is a gap in the data between 5 and 7.

45

Match each expression in the first column to its equivalent expression in the first row.

	4(9 + 4)	3(8 + 5)	6(7 + 10)
24 + 15	☐	☐	☐
42 + 60	☐	☐	☐
36 + 16	☐	☐	☐

46

The list below shows the numbers of miles that Mel ran each day last week.

8, 3, 8, 6, 7, 8, 2

Part A: What is the range of the set of data?

Part B: What is the mean absolute deviation for Mel's mileage data?

47

Place a check mark next to each expression that is equivalent to $42x - 14y$.

A. ☐ $6(7x - 2y)$

B. ☐ $7(6x - 2y)$

C. ☐ $14(6x - y)$

D. ☐ $14(3x - y)$

E. ☐ $2(21x - 7)$

48

An expression is shown.

$11{,}856 \div 52$

What is the value of the expression?

Ⓐ 223

Ⓑ 228

Ⓒ 233

Ⓓ 238

49

Place a check mark in the box next to each statistical question.

A. ☐ How many points did Lisa score in the basketball game?

B. ☐ How many points did the team score in each game it played?

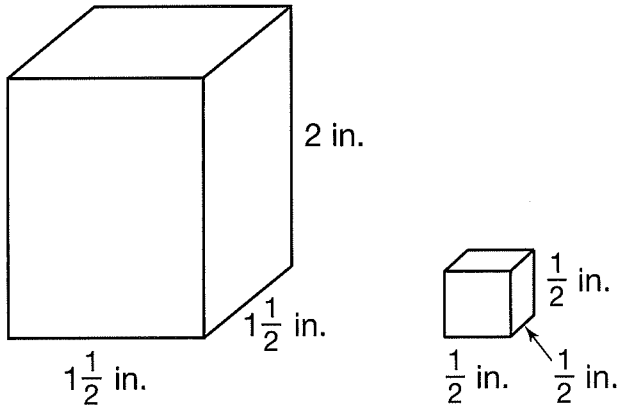
C. ☐ How many points did the team score in each of its home games?

D. ☐ Who scored the most points in yesterday's game?

E. ☐ What percent of their shots does each of the team's players make?

50

Joseph is packing the large box with small boxes. The small boxes are packed tightly with no spaces between.



Part A: How many small boxes are there in the large box?

Part B: What is the volume, in square inches, of the large box?

51

Which is the solution of the equation below?

$2y - 15 = 41$

Ⓐ $y = 56$

Ⓑ $y = 28$

Ⓒ $y = 26$

Ⓓ $y = 13$

52

When Ramona went to bed, the temperature was 12°F. When she woke up, the temperature was −5°F. Explain how a temperature of 0°F relates to these two temperatures.

53

Complete the table below by converting the measurements.

Inches	Feet	Yards
36		
	6	
		3

54

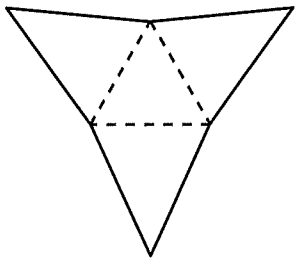
A large pizza costs $18. Each topping costs an additional $2.25, and each side costs an additional $2.50.

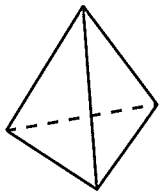
Part A: Write an expression to represent the cost of a large pizza with t toppings and s sides.

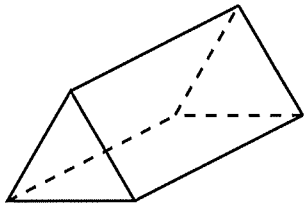
Part B: What is the cost of buying a large pizza with 2 toppings and 3 sides?

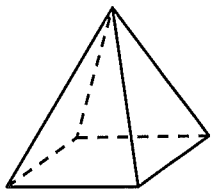
55

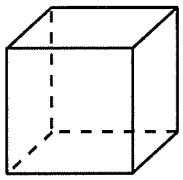
Which figure could the net below represent?



Ⓐ 

Ⓒ 

Ⓑ 

Ⓓ 

56

Write an expression that is equivalent to $4 \times x \times x \times x$.

57

The temperature in Nome is colder than −4°C.

Place a check mark next to each value that could represent the temperature of Nome.

A. ☐ −10°C

B. ☐ −6°C

C. ☐ −4°C

D. ☐ 0°C

E. ☐ 4°C

F. ☐ 6°C

58

Eight hundred forty-five tickets were sold for a concert. Six hundred ninety-two people attended the concert.

Part A: Write an equation for m, the number of people who bought tickets but did not attend.

Part B: Solve your equation for m.

59

A freight train is traveling at a constant speed. The table below shows how far the train travels after different amounts of time.

Time (in hours)	Distance (in miles)
2	80
3	120
5	200
8	320

Write an equation for d, the distance traveled by the train, after h hours.

60

Sally plotted the points (2, 3), (2, −2), and (−3, −2) on a coordinate plane. Which point could Sally plot such that all the points would be vertices of a square?

Ⓐ (5, 3)

Ⓑ (2, −1)

Ⓒ (−3, 3)

Ⓓ (−3, −2)

61

Match each expression in the first column to its equivalent expression in the first row.

	$6n$	$2n + 3n$	$n^2\ n^3$	$2(5n - 1)$
$10n - 2$	☐	☐	☐	☐
n^5	☐	☐	☐	☐
$2(3n)$	☐	☐	☐	☐
$5n$	☐	☐	☐	☐

62

The Wilsons drove to visit some friends. The table below shows how long it took the Wilsons to drive certain distances.

Miles	120	180	240
Hours	2	3	4

Which unit rate describes the Wilsons' speed?

Ⓐ 30 miles per $\frac{1}{2}$ hour

Ⓑ 55 miles per hour

Ⓒ 60 miles per hour

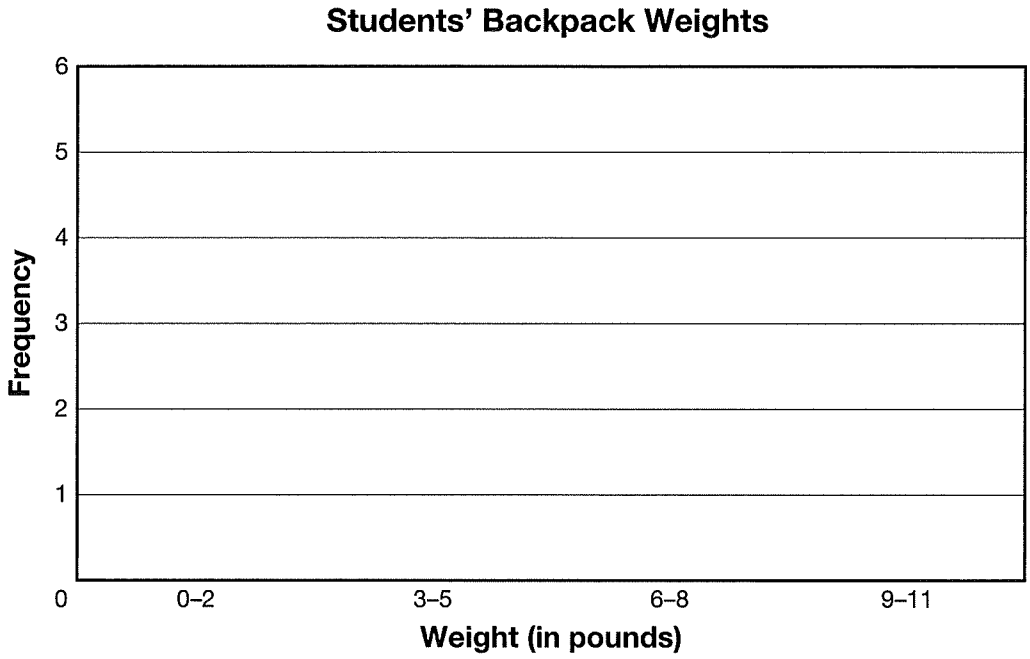
Ⓓ 120 miles per 2 hours

63

Louise weighed the backpacks of students when they arrived at class. The list below shows the weights, in pounds, of the backpacks.

8, 4, 7, 6, 0, 7, 11, 11, 3, 0, 4, 10, 6, 11, 10, 5, 7

Create a histogram of Louise's data. Use intervals of 3 pounds for the horizontal axis.



64

A bowling alley charges each person $6 to play a game and $4.50 to rent a pair of bowling shoes.

Part A: Write an expression to represent the total cost for *f* friends to play a game and rent shoes.

Part B: Write an expression to show how much the bowling alley will charge *f* friends if they each play 3 games and all but one of them rents shoes.

65

The numbers of students who enrolled in Ms. Lander's five photography classes are shown below.

20, 15, 23, 19, 13

What is the mean absolute deviation of the data?

Ⓐ 1.6

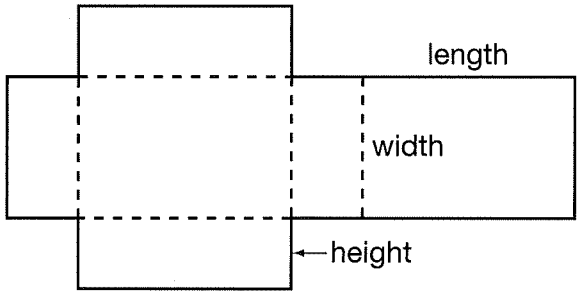
Ⓑ 3.2

Ⓒ 16

Ⓓ 18

66

The net below represents a rectangular prism with a surface area of 54 square feet.



Which could be the dimensions of the prism?

Ⓐ $l = 5$ ft, $w = 4$ ft, $h = 1$ ft

Ⓑ $l = 6$ ft, $w = 3$ ft, $h = 1\frac{1}{2}$ ft

Ⓒ $l = 4$ ft, $w = 3$ ft, $h = 1$ ft

Ⓓ $l = 5$ ft, $w = 3$ ft, $h = 1\frac{1}{2}$ ft

STOP

Grade 6 Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Formulas

$A = bh$

$A = lw$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}h(b_1 + b_2)$

$V = Bh$

$V = lwh$