

VIRGINIA STANDARDS OF LEARNING

Released Test

GRADE 7

MATHEMATICS

2009 Mathematics Standards of Learning

Released Spring 2014

Property of the Virginia Department of Education

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Items 1 through 7 are in the non-calculator section of the test.

Items 8 through 50 are in the calculator section of the test.

SAMPLE A

What is the solution to $2x = 6$?

- ☐ **A** $x = 3$
- ☐ **B** $x = 4$
- ☐ **C** $x = 8$
- ☐ **D** $x = 12$

Directions: Type your answer in the box.

SAMPLE B

Stephanie ran 3 miles in 30 minutes. At this rate, what is the total number of minutes it will take Stephanie to run 2 miles?

minutes

Which of the following is true?

- ☐ A $-10 + 14 = 4$
- ☐ B $-14 \div 10 = 1.4$
- ☐ C $10 - 14 = 4$
- ☐ D $14 \times (-10) = 140$

Which number is a square root of 400 ?

- ☐ A 400
- ☐ B 200
- ☐ C 40
- ☐ D 20

What is 0.000012 written in scientific notation?

- ☐ A 1.2×10^{-5}
- ☐ B 1.2×10^{-4}
- ☐ C 1.2×10^4
- ☐ D 1.2×10^5

Directions: Click and drag each selected number to the correct box.

Arrange the three numbers shown in order from least to greatest.

Least	
↓	
Greatest	

4.7×10^5	3.9×10^8	5.2×10^5
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Which list of numbers is arranged from least to greatest?

- ☐ A 0.25, 17%, $\frac{2}{9}$
- ☐ B 0.25, $\frac{2}{9}$, 17%
- ☐ C 17%, 0.25, $\frac{2}{9}$
- ☐ D 17%, $\frac{2}{9}$, 0.25

Directions: Type your answer in the box.

What is the value of $(-15) - (-18) \div 3$?

Which number is a square root of 1 ?

☐ **A** $\frac{1}{4}$

☐ **B** $\frac{1}{2}$

☐ **C** 1

☐ **D** 2

The non-calculator section of the test ends here.

Let n represent any number in this sequence.

2, 24, 46, 68, . . .

Which of these can be used to determine the next number?

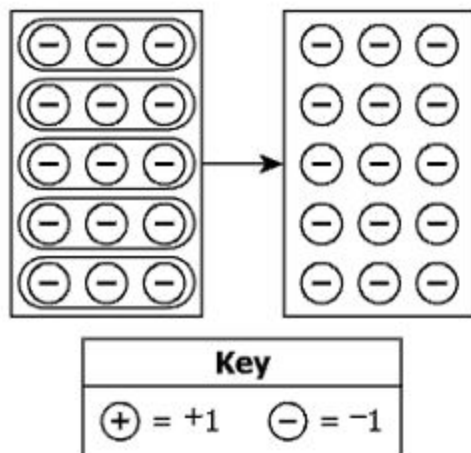
☐ A $\frac{n}{12}$

☐ B $12n$

☐ C $n + 22$

☐ D $n - 22$

Which number sentence is represented by this model?



- ☐ A $-3 \cdot 5 = 15$
- ☐ B $-3 \cdot 5 = -15$
- ☐ C $-3 \cdot (-5) = 15$
- ☐ D $-3 \cdot (-5) = -15$

Clarence made a scale drawing of a classroom. The scale in the drawing is 2 inches represents 9 feet. The actual length of the classroom is 36 feet. What is the length of the classroom on the scale drawing?

- ☐ A 4 inches
- ☐ B 8 inches
- ☐ C 27 inches
- ☐ D 162 inches

Which fraction and decimal are equivalent to 10^{-3} ?

- ☐ A $\frac{-1}{10^3}$ and -0.003
- ☐ B $\frac{1}{10^3}$ and -0.003
- ☐ C $\frac{-1}{10^3}$ and 0.001
- ☐ D $\frac{1}{10^3}$ and 0.001

What is the absolute value of -8.2 ?

- ☐ A 8.2
- ☐ B 4.1
- ☐ C -4.1
- ☐ D -8.2

Which statement is true about the pattern shown?

5, 20, 80, 320, . . .

- ☐ A The common ratio is 4.
- ☐ B The common ratio is 15.
- ☐ C The common difference is 4.
- ☐ D The common difference is 15.

Kelly received a 25% discount on the purchase of a \$240 bicycle. What was the amount of the discount Kelly received?

- ☐ **A** \$25
- ☐ **B** \$60
- ☐ **C** \$180
- ☐ **D** \$215

Which number sentence is represented by this model?

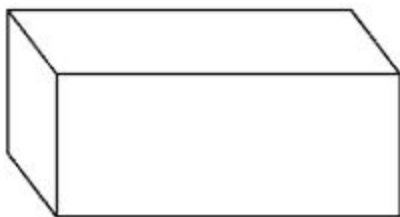


- ☐ A $-4 \cdot 7 = 28$
- ☐ B $-4 \cdot 7 = -28$
- ☐ C $4 \cdot (-7) = 28$
- ☐ D $4 \cdot (-7) = -28$

What is $\left| \frac{-11}{12} \right|$?

- ☐ A $\frac{12}{11}$
- ☐ B $\frac{11}{12}$
- ☐ C $-\frac{11}{12}$
- ☐ D $-\frac{12}{11}$

The length of Rectangular Prism A is shown.



6 in.

Rectangular Prism A

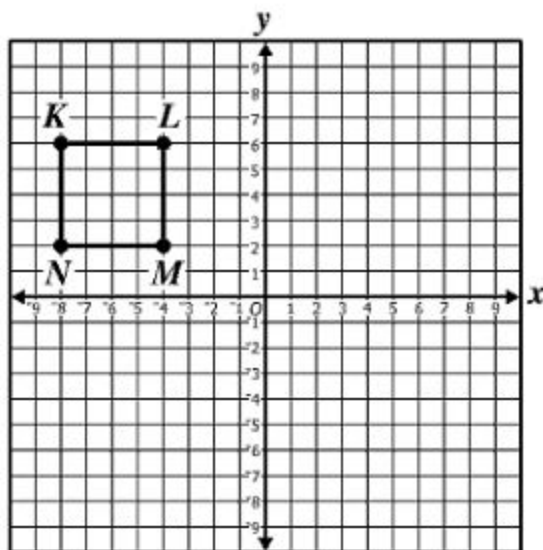
The length of this prism is multiplied by a scale factor of $\frac{1}{2}$ to create Rectangular Prism B. The volume of Rectangular Prism B is —

- ☐ A 2 times the volume of Rectangular Prism A
- ☐ B 3 times the volume of Rectangular Prism A
- ☐ C $\frac{1}{4}$ the volume of Rectangular Prism A
- ☐ D $\frac{1}{2}$ the volume of Rectangular Prism A

Which statement is false?

- ☐ **A** All squares are rectangles.
- ☐ **B** All squares are parallelograms.
- ☐ **C** All rhombuses are squares.
- ☐ **D** All rhombuses are parallelograms.

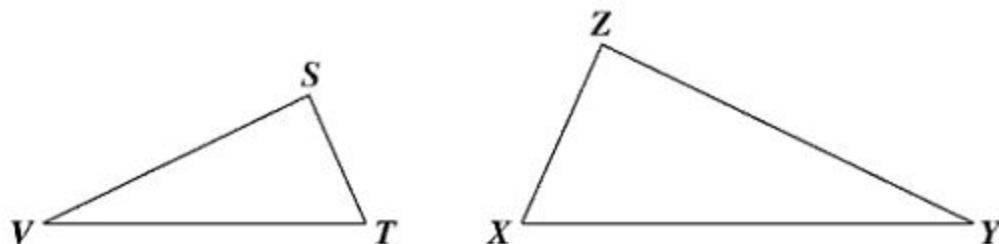
Quadrilateral $KLMN$ is rotated 180° clockwise about the origin. Which coordinates best represent the image of point K ?



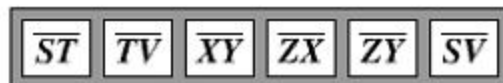
- ☐ A (6, 8)
- ☐ B (-4, 2)
- ☐ C (8, -6)
- ☐ D (4, -2)

Directions: Click and drag the correct answers to the boxes.

Triangle STV and triangle ZXY are similar. Which pair of segments are corresponding sides of these triangles?

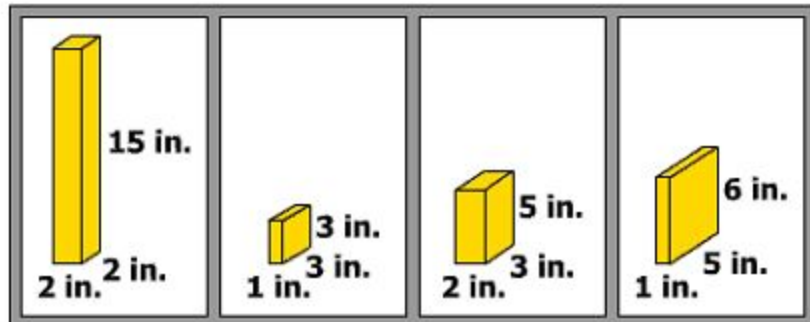


and



Directions: Click on a box to choose each prism you want to select. You must select all correct prisms.

The dimensions of 4 rectangular prisms are shown. Identify each of the prisms for which the maximum amount of sand the prism can hold is 30 cubic inches.



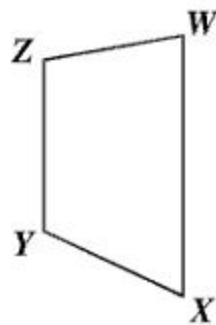
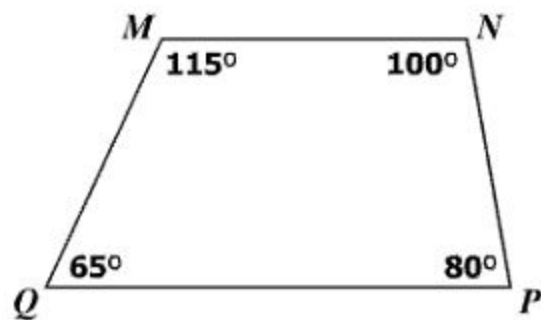
A rectangular prism has a height of 3 inches and a volume of 27 cubic inches. The height of this prism is changed to 6 inches, and the other dimensions stay the same. What is the volume of the prism with this change?

- ☐ **A** 30 cubic inches
- ☐ **B** 54 cubic inches
- ☐ **C** 81 cubic inches
- ☐ **D** 162 cubic inches

Every rhombus is also a —

- ☐ A parallelogram
- ☐ B trapezoid
- ☐ C rectangle
- ☐ D square

Quadrilateral $PQMN$ is similar to quadrilateral $WXYZ$.



What is the measure of angle Z ?

- ☐ A 65°
- ☐ B 80°
- ☐ C 100°
- ☐ D 115°

This table shows the dimensions of four rectangular prisms.

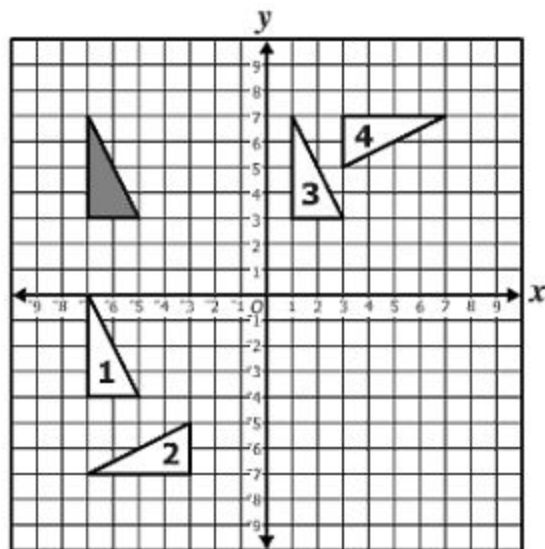
Rectangular Prism Dimensions

Rectangular Prism	Length (in feet)	Width (in feet)	Height (in feet)
Q	8	4	5
R	6	7	12
S	4	10	12
T	2	13	5

Which rectangular prism has the greatest volume?

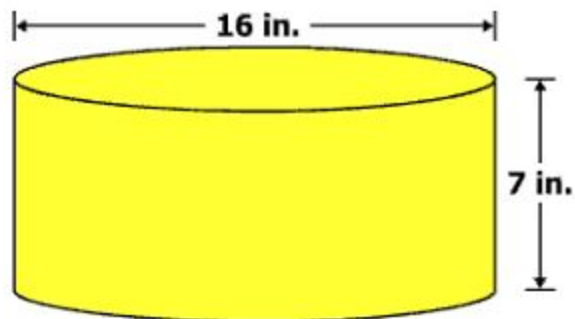
- ☐ **A** Rectangular Prism Q
- ☐ **B** Rectangular Prism R
- ☐ **C** Rectangular Prism S
- ☐ **D** Rectangular Prism T

Which numbered triangle is a 90° counterclockwise rotation about the origin of the shaded triangle?



- ☐ A Triangle 1
- ☐ B Triangle 2
- ☐ C Triangle 3
- ☐ D Triangle 4

The diameter and height of a cylindrical container are shown.

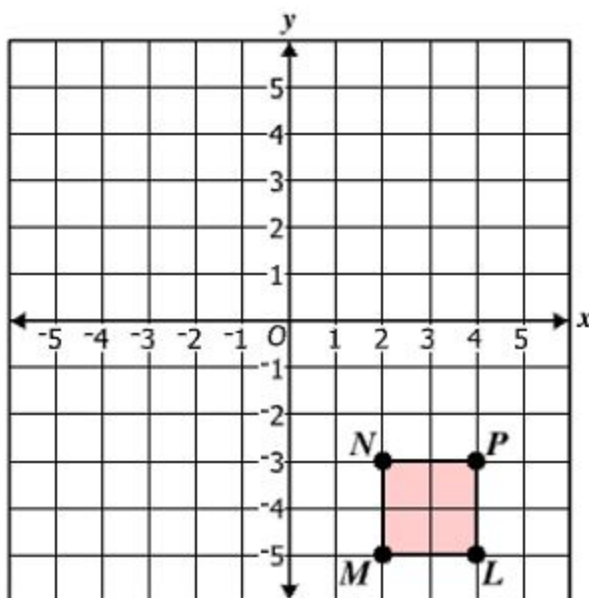


The container is filled completely with cheese sauce. Which of these represents the total number of cubic inches of cheese sauce in the container?

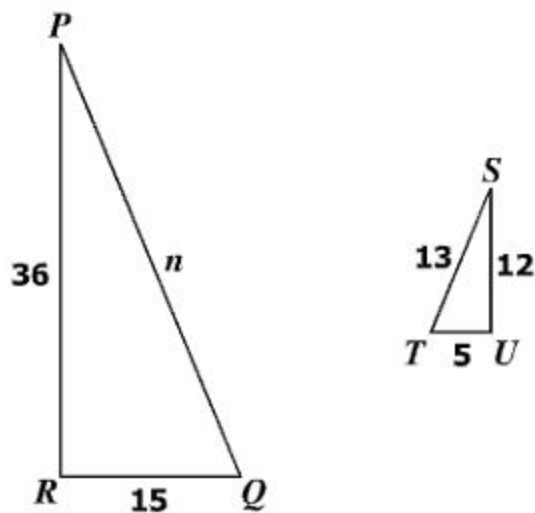
- ☐ A $\pi \cdot 8^2 \cdot 7$
- ☐ B $\pi \cdot 16^2 \cdot 7$
- ☐ C $2\pi \cdot 8^2 + 2\pi \cdot 8 \cdot 7$
- ☐ D $2\pi \cdot 16^2 + 2\pi \cdot 16 \cdot 7$

Directions: Click on the grid to plot a point.

Figure $LMNP$ will be reflected across the y -axis. Place the point on the graph that represents point N' .



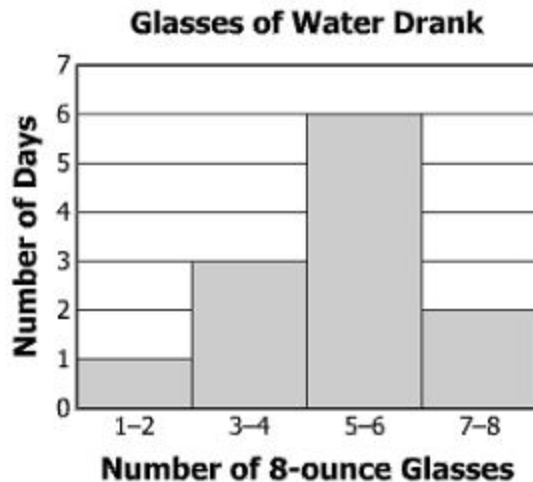
Triangle PQR is similar to triangle STU .



Which proportion can be used to find n ?

- ☐ A $\frac{5}{15} = \frac{n}{12}$
- ☐ B $\frac{15}{5} = \frac{n}{12}$
- ☐ C $\frac{13}{n} = \frac{12}{36}$
- ☐ D $\frac{13}{n} = \frac{36}{12}$

The number of 8-ounce glasses of water Shane drank each day for 12 days is represented in this histogram.



Based on this histogram, which statement must be true?

- ☐ **A** On exactly 2 of these days, Shane drank 1 to 2 glasses of water.
- ☐ **B** On exactly 3 of these days, Shane drank 7 to 8 glasses of water.
- ☐ **C** On exactly 25% of these days, Shane drank 3 to 4 glasses of water.
- ☐ **D** On exactly 60% of these days, Shane drank 5 to 6 glasses of water.

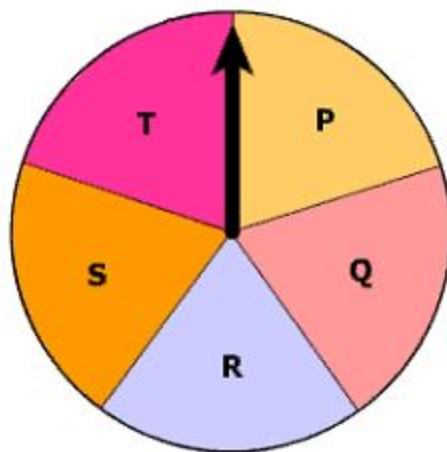
The digits 1, 2, 3, and 4 are used to make a 3-digit number. Each digit can be repeated. What is the total number of 3-digit numbers that can be made using these digits?

- ☐ A 12
- ☐ B 27
- ☐ C 64
- ☐ D 81

If $k = 2$, what is the value of $k^3 - (k - 10) + 4k$?

- ☐ A 6
- ☐ B 8
- ☐ C 22
- ☐ D 24

A spinner has 5 sections of equal size labeled P, Q, R, S, and T. The arrow of this spinner was spun 15 times and landed 4 times on the section labeled Q.



Which statement best describes the experimental probability and theoretical probability of the arrow landing on the section labeled Q ?

- ☐ A The experimental probability is $\frac{1}{5}$, and the theoretical probability is $\frac{1}{5}$.
- ☐ B The experimental probability is $\frac{1}{5}$, and the theoretical probability is $\frac{4}{15}$.
- ☐ C The experimental probability is $\frac{4}{15}$, and the theoretical probability is $\frac{1}{5}$.
- ☐ D The experimental probability is $\frac{4}{15}$, and the theoretical probability is $\frac{4}{15}$.

Ethan earns \$12 per hour to walk 2 dogs, plus an additional \$7 for brushing the 2 dogs after their walk.

- Let x represent the hours Ethan works.
- Let y represent the total he earns each day.

Which number sentence best represents this situation?

- ☐ A $12x + 2 + 7 = y$
- ☐ B $12x \cdot 2 + 7 = y$
- ☐ C $12x + 7 = y$
- ☐ D $12x - 7 = y$

Aidan's age is 6 years less than half of Maggie's age. Aidan's age is 4 years. What is Maggie's age?

- ☐ **A** 2 years
- ☐ **B** 5 years
- ☐ **C** 10 years
- ☐ **D** 20 years

What is the solution to $-12x \leq -72$?

- ☐ A $x \geq 6$
- ☐ B $x \leq 6$
- ☐ C $x \geq -6$
- ☐ D $x \leq -6$

Directions: Click on a box to choose the property you want to select. You must select the correct property.

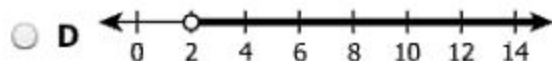
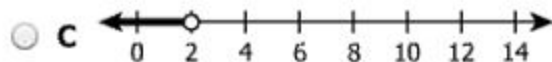
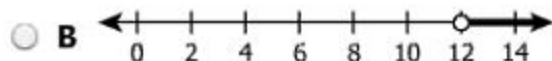
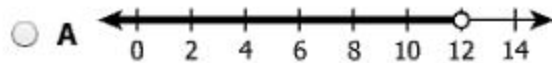
Which property is illustrated by this number sentence?

$$(-1 \cdot 7) + 3 = 3 + (-1 \cdot 7)$$

Associative Property of Addition	Commutative Property of Addition	Distributive Property
Associative Property of Multiplication	Commutative Property of Multiplication	Multiplicative Identity Property

Which graph represents the solution set to this inequality?

$$x + 5 < 7$$



This stem-and-leaf plot shows the high temperatures for a city over 20 days.

High Temperatures

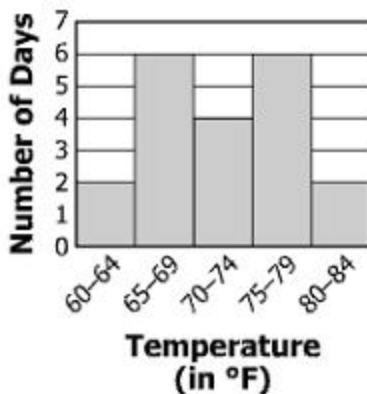
Stem	Leaf
6	2 4 5 7 7 7 8 8
7	0 0 1 1 4 4 5 5 7 8
8	0 2

Key

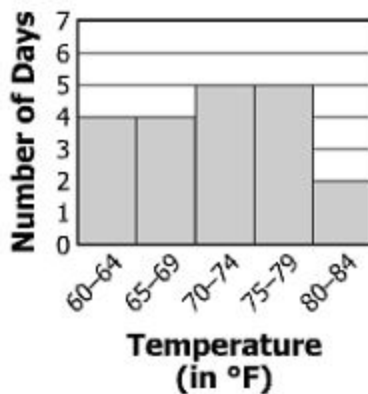
6|1 means 61°F

Which histogram represents the same set of data?

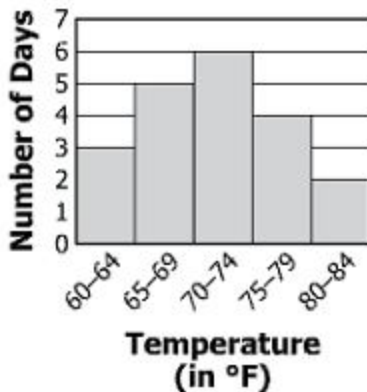
High Temperatures



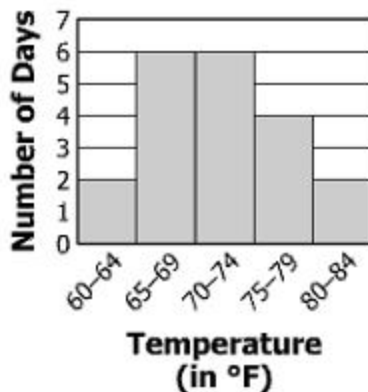
High Temperatures



High Temperatures



High Temperatures



Marjorie bought 24 bottles of juice. Each day she opens and drinks 2 of these bottles of juice. Which of the following best represents the number of unopened bottles of juice Marjorie has at the end of d days?

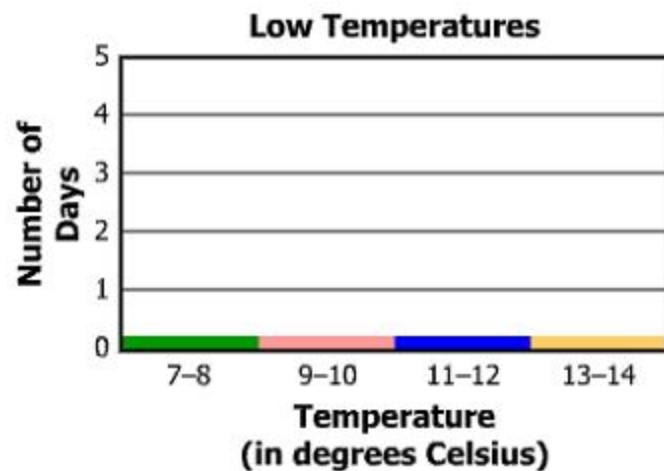
- ☐ A $2d - 24$
- ☐ B $24d - 2$
- ☐ C $24 + 2d$
- ☐ D $24 - 2d$

Directions: Click on a location above each bar to show the bar height.

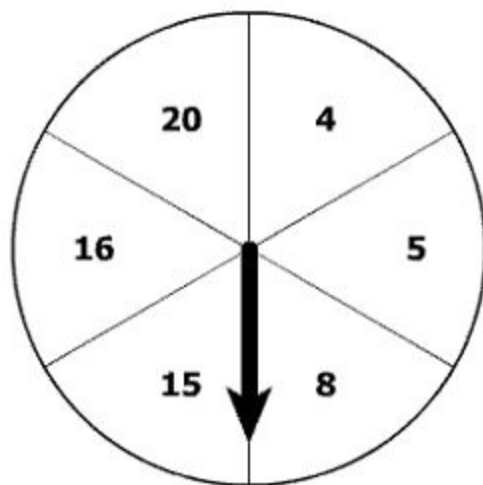
Scott recorded the low temperature in Richmond each day for 10 days. This list shows the temperatures in degrees Celsius.

8°, 12°, 11°, 9°, 9°, 12°, 10°, 14°, 13°, 12°

Create a histogram of this set of data.



This spinner has 6 sections of equal size.



The arrow of this spinner was spun 60 times. On 45 out of 60 times, the arrow landed on a section labeled with a multiple of 4. What was the experimental probability of the arrow landing on a section labeled with a multiple of 4 ?

☐ A $\frac{1}{3}$

☐ B $\frac{1}{2}$

☐ C $\frac{2}{3}$

☐ D $\frac{3}{4}$

What is the solution to $\frac{x}{-4} = 10$?

- ☐ A -40
- ☐ B -6
- ☐ C 6
- ☐ D 40

Which of the following is the algebraic form for the verbal statement shown?

"13 more than the product of 4 and a number, n "

- ☐ A $\frac{n}{4} + 13$
- ☐ B $4n + 13$
- ☐ C $4(n + 13)$
- ☐ D $13(n + 4)$

The table shows the results of 50 rolls of a fair number cube numbered 1 to 6.

Number	Frequency
1	8
2	9
3	5
4	15
5	2
6	11

According to the data in the table, what was the experimental probability of rolling a 1 ?

- ☐ A $\frac{4}{25}$
- ☐ B $\frac{1}{6}$
- ☐ C $\frac{9}{50}$
- ☐ D $\frac{1}{5}$

A spinner has sections labeled W, X, Y, and Z. The faces of a number cube are labeled 1, 2, 3, 4, 5, and 6. What is the total number of possible outcomes of 1 spin of the arrow on the spinner and 1 roll of the number cube?

- ☐ A 6
- ☐ B 10
- ☐ C 24
- ☐ D 48

Which value of k makes $-5 > k + 11$ true?

- ☐ A 8
- ☐ B -4
- ☐ C -16
- ☐ D -22

Which table contains only the points that lie on the line represented by $y = \frac{5}{4}x - 3$?

☐ A

x	y
-2	0.5
4	8

☐ C

x	y
-1	2.2
5	7

☐ B

x	y
-1	-3.8
5	1

☐ D

x	y
-2	-5.5
4	2

What is the value of n that makes the following true?

$$n + (-7) = -77$$

- ☐ A -84
- ☐ B -70
- ☐ C 84
- ☐ D 70

What is the solution to $c - 14 < 16$?

- ☐ A $c < 2$
- ☐ B $c > 2$
- ☐ C $c < 30$
- ☐ D $c > 30$