VIRGINIA STANDARDS OF LEARNING

Released Test

GRADE 7

MATHEMATICS

2009 Mathematics Standards of Learning

Released Spring 2014

Property of the Virginia Department of Education

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** $^{-}14\div10=1.4$
- **C** $10-14=4$
- **D** $14\times(^{-}10)=140$

Which number is a square root of 400 ?

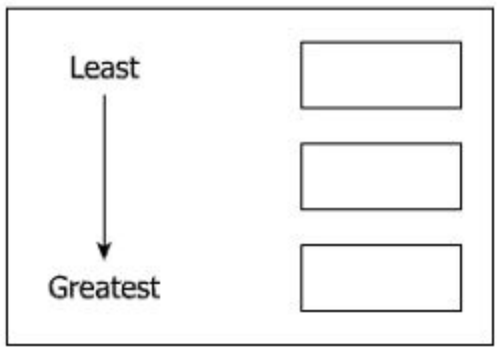
- **A** 400
- **B** 200
- **C** 40
- **D** 20

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.



4.7×10^5	3.9×10^8	5.2×10^5

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.

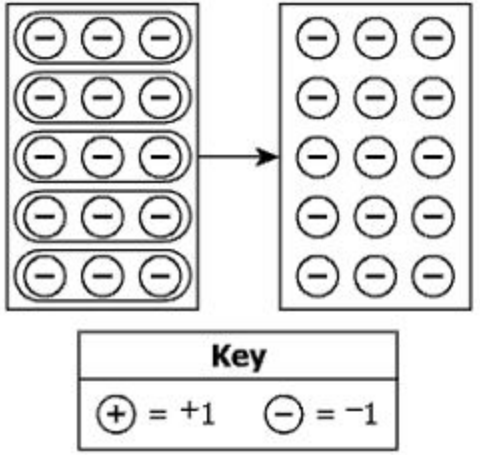
Let n represent any number in this sequence.

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?

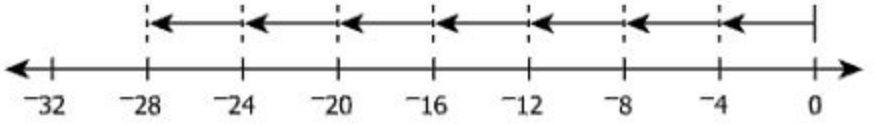
5, 20, 80, 320, . . .

- **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?

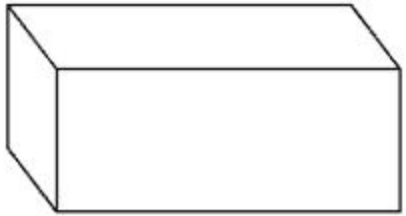


- **A** $-4 \cdot 7 = 28$
- **B** $-4 \cdot 7 = -28$
- **C** $4 \cdot (-7) = 28$
- **D** $4 \cdot (-7) = -28$

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

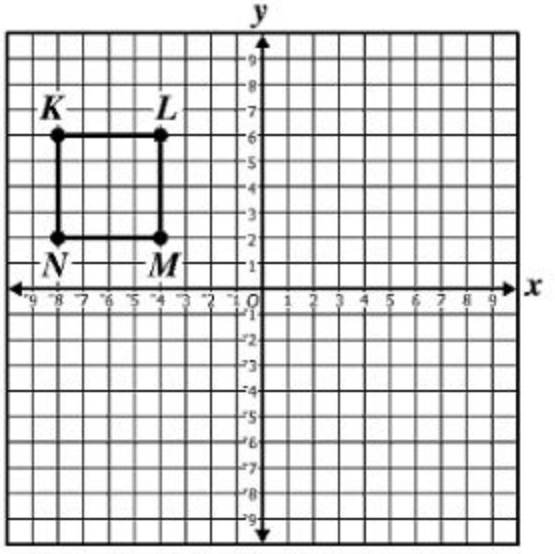
The length of this prism is multiplied by a scale factor of $\frac{1}{2}$ to create Rectangular Prism B. The volume of Rectangular Prism B is —

- **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.

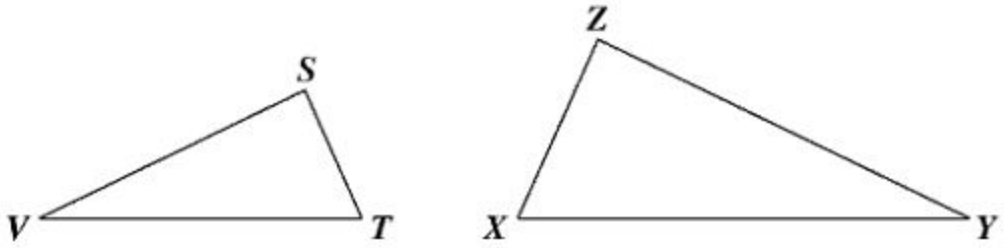
Quadrilateral $KLMN$ is rotated 180° clockwise about the origin. Which coordinates best represent the image of point K ?



- **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?

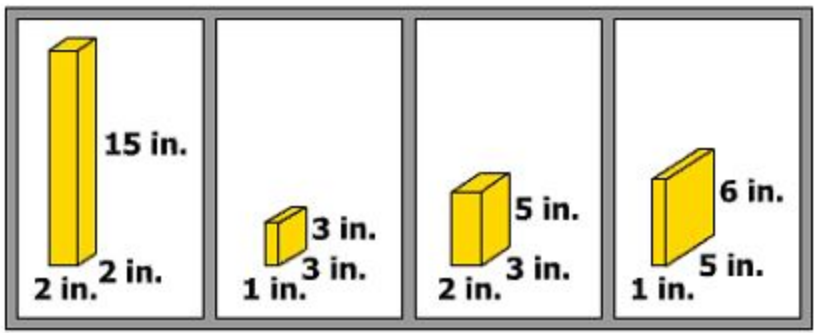


☐ and ☐

$\overline{ST}$	$\overline{TV}$	$\overline{XY}$	$\overline{ZX}$	$\overline{ZY}$	$\overline{SV}$

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.



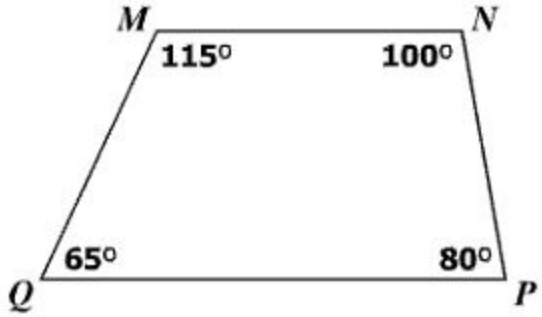
A rectangular prism has a height of 3 inches and a volume of 27 cubic inches. The height of this prism is changed to 6 inches, and the other dimensions stay the same. What is the volume of the prism with this change?

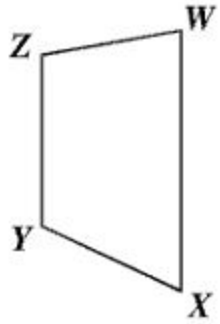
- **A** 30 cubic inches
- **B** 54 cubic inches
- **C** 81 cubic inches
- **D** 162 cubic inches

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.

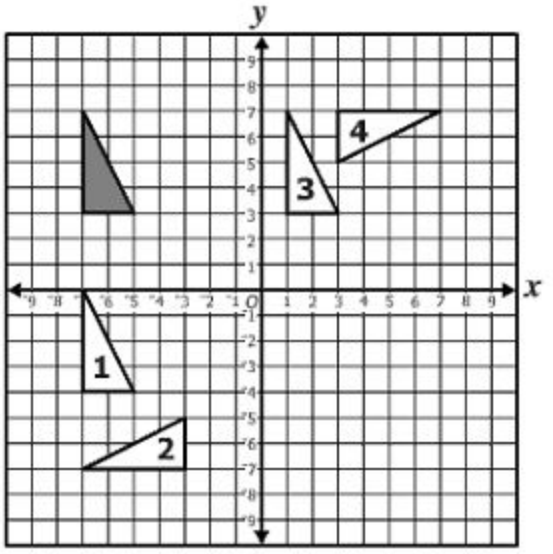
Rectangular Prism Dimensions

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?

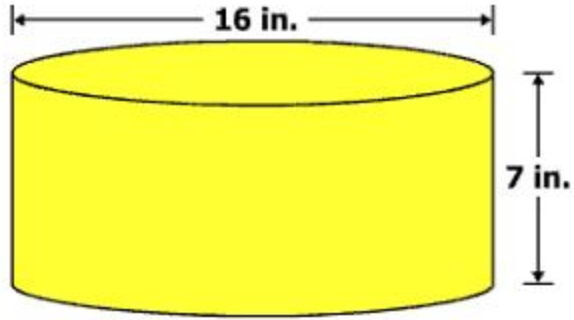
- **A** Rectangular Prism Q
- **B** Rectangular Prism R
- **C** Rectangular Prism S
- **D** Rectangular Prism T

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.

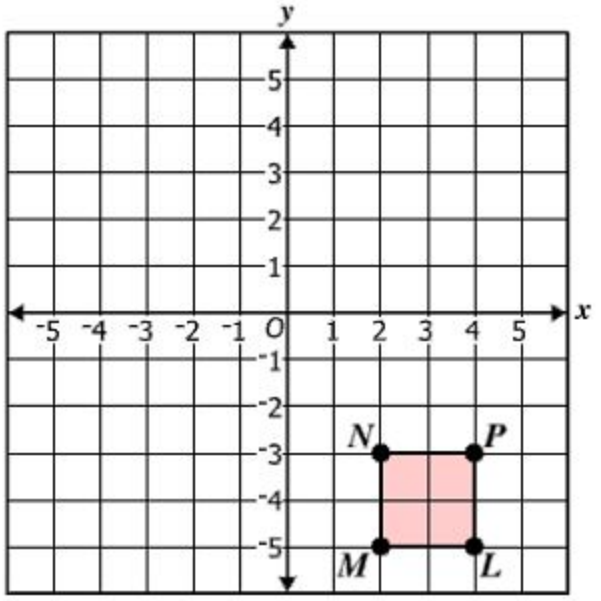


The container is filled completely with cheese sauce. Which of these represents the total number of cubic inches of cheese sauce in the container?

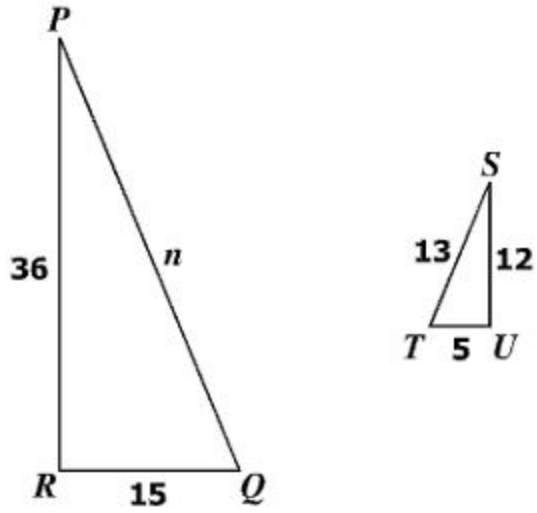
- A $\pi \cdot 8^2 \cdot 7$
- B $\pi \cdot 16^2 \cdot 7$
- C $2\pi \cdot 8^2 + 2\pi \cdot 8 \cdot 7$
- D $2\pi \cdot 16^2 + 2\pi \cdot 16 \cdot 7$

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'.



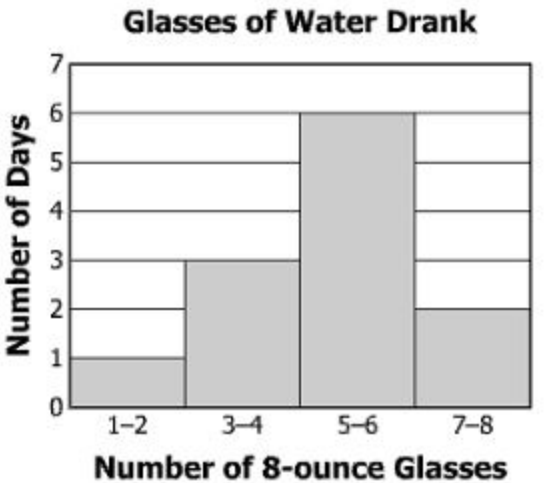
Triangle PQR is similar to triangle STU.



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.

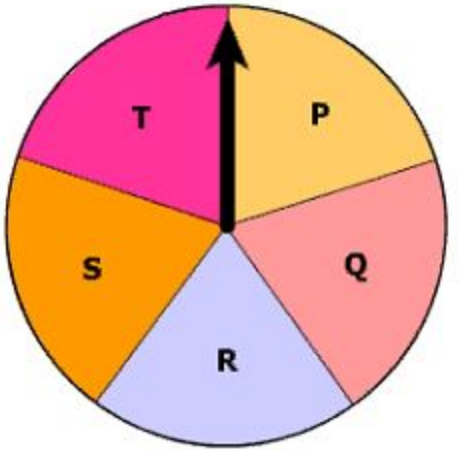
The digits 1, 2, 3, and 4 are used to make a 3-digit number. Each digit can be repeated. What is the total number of 3-digit numbers that can be made using these digits?

- **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?

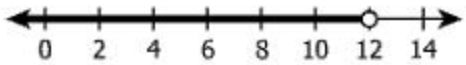
$$(-1 \cdot 7) + 3 = 3 + (-1 \cdot 7)$$

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

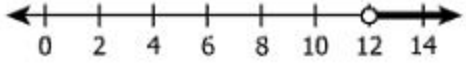
Which graph represents the solution set to this inequality?

$$x + 5 < 7$$

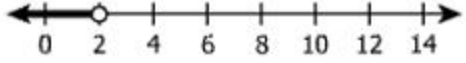
A



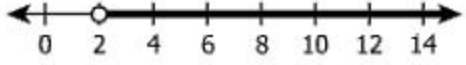
B



C



D



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

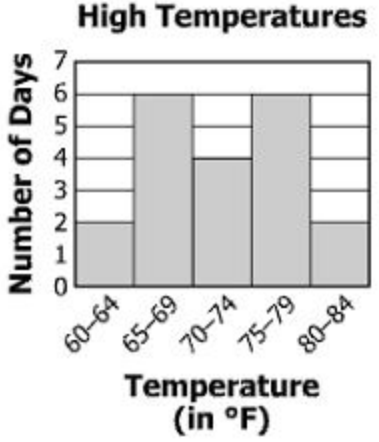
High Temperatures

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

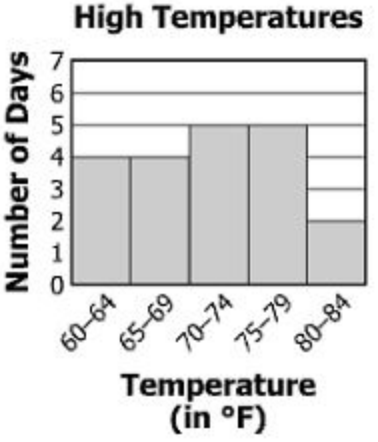
Key
6|1 means 61°F

Which histogram represents the same set of data?

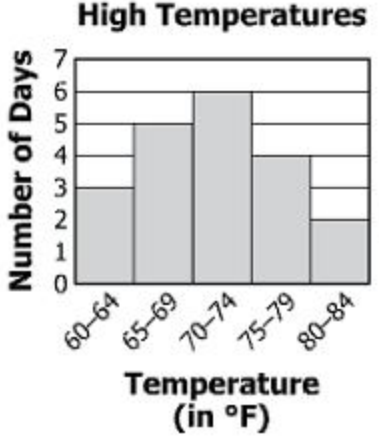
A



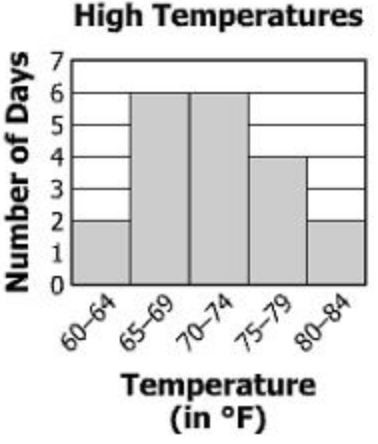
C



B



D



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?

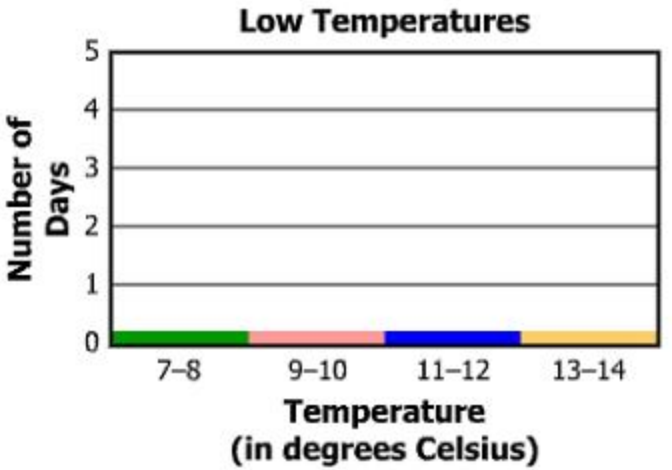
- **A** $2d - 24$
- **B** $24d - 2$
- **C** $24 + 2d$
- **D** $24 - 2d$

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

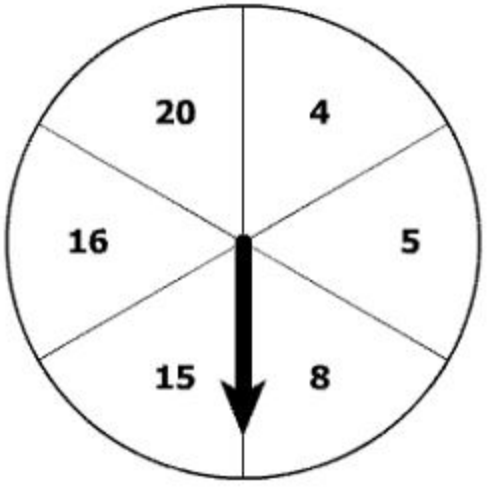
Scott recorded the low temperature in Richmond each day for 10 days. This list shows the temperatures in degrees Celsius.

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

B

x	y
−1	−3.8
5	1

C

x	y
−1	2.2
5	7

D

x	y
−2	−5.5
4	2

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

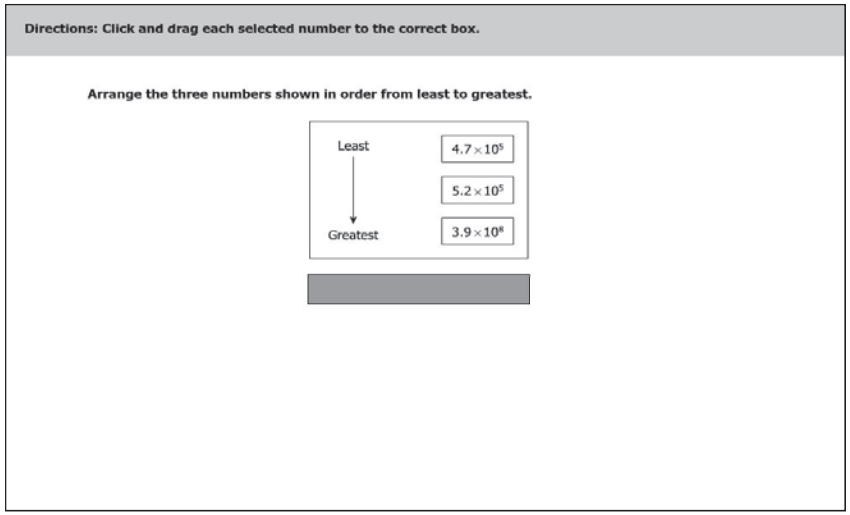
$$n + (-7) = -77$$

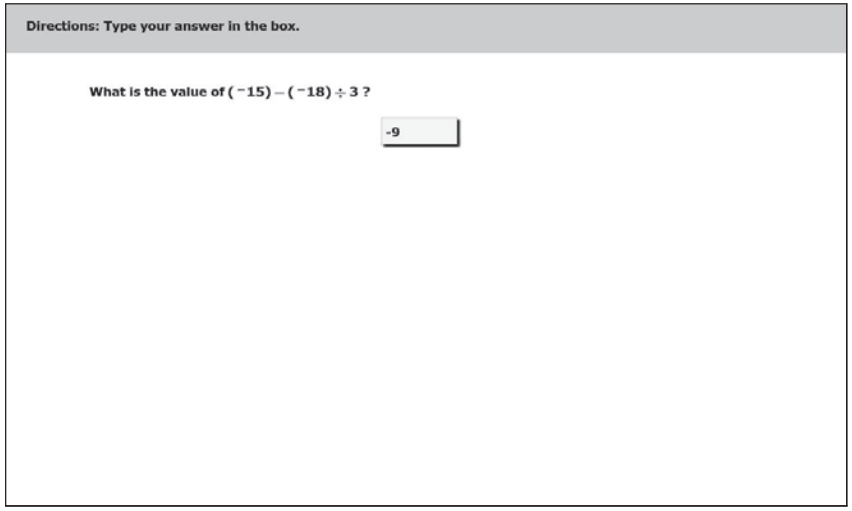
- **A** -84
- **B** -70
- **C** 84
- **D** 70

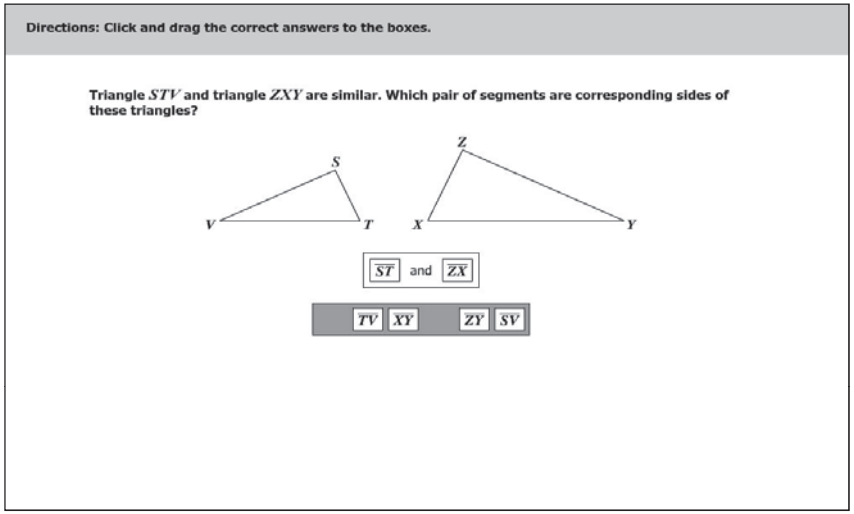
What is the solution to $c - 14 < 16$?

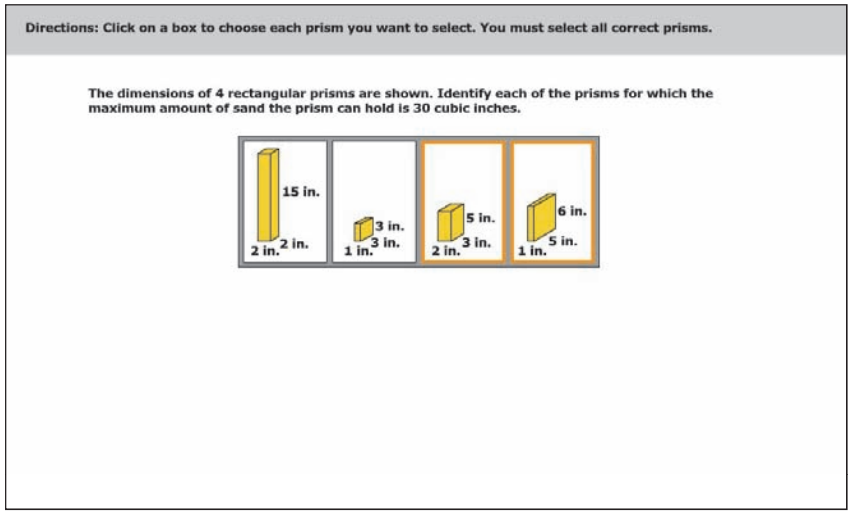
- **A** $c < 2$
- **B** $c > 2$
- **C** $c < 30$
- **D** $c > 30$

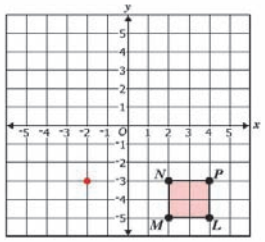
Grade 7 Mathematics
Released Test Spring 2014
Answer Key

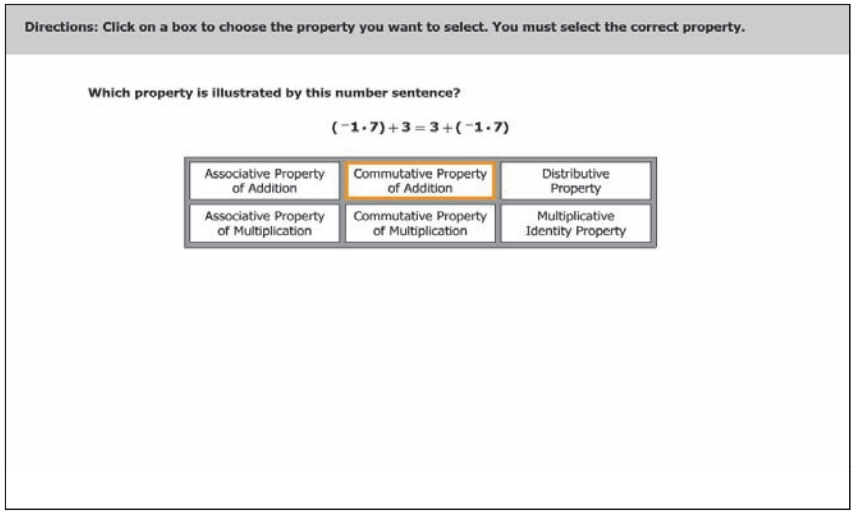
Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
1	MC	A	001	Number, Number Sense, Computation and Estimation
2	MC	D	001	Number, Number Sense, Computation and Estimation
3	MC	A	001	Number, Number Sense, Computation and Estimation
4	TEI	Answers must be placed in the correct order from top to bottom: $4.7 \times 10^5;\ 5.2 \times 10^5;\ 3.9 \times 10^8$ 	001	Number, Number Sense, Computation and Estimation
5	MC	D	001	Number, Number Sense, Computation and Estimation

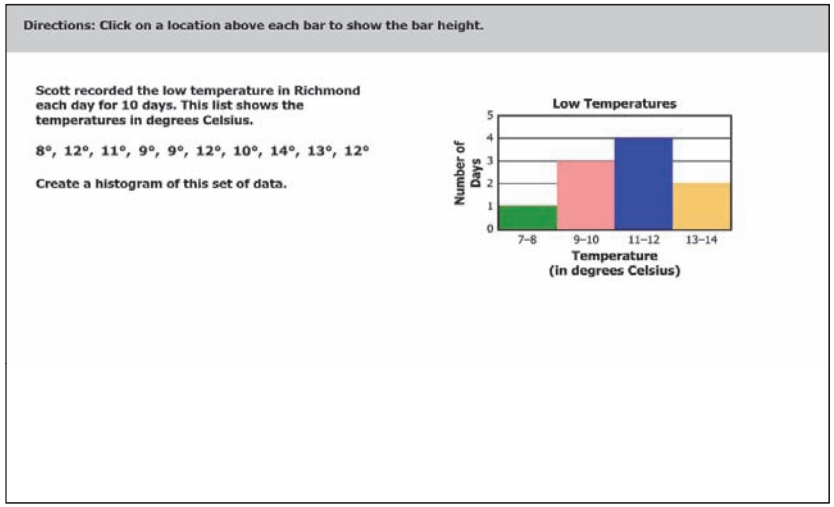
Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
6	TEI	Typed Response: -9 	001	Number, Number Sense, Computation and Estimation
7	MC	C	001	Number, Number Sense, Computation and Estimation
8	MC	C	001	Number, Number Sense, Computation and Estimation
9	MC	B	001	Number, Number Sense, Computation and Estimation
10	MC	B	001	Number, Number Sense, Computation and Estimation
11	MC	D	001	Number, Number Sense, Computation and Estimation
12	MC	A	001	Number, Number Sense, Computation and Estimation
13	MC	A	001	Number, Number Sense, Computation and Estimation
14	MC	B	001	Number, Number Sense, Computation and Estimation
15	MC	B	001	Number, Number Sense, Computation and Estimation
16	MC	B	001	Number, Number Sense, Computation and Estimation
17	MC	D	002	Measurement and Geometry
18	MC	C	002	Measurement and Geometry
19	MC	C	002	Measurement and Geometry

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
20	TEI	Any ONE of these answers: $\overline{ST}$ and $\overline{ZX}$ (in either order); $\overline{TV}$ and $\overline{XY}$ (in either order); or $\overline{SV}$ and $\overline{ZY}$ (in either order) 	002	Measurement and Geometry

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
21	TEI	The last two prisms in the row on the right. Both of these answers, and only these answers, must be selected. 	002	Measurement and Geometry
22	MC	B	002	Measurement and Geometry
23	MC	A	002	Measurement and Geometry
24	MC	C	002	Measurement and Geometry
25	MC	B	002	Measurement and Geometry
26	MC	B	002	Measurement and Geometry
27	MC	A	002	Measurement and Geometry

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
28	TEI	A point must be plotted on the coordinate plane at (−2, −3). **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'.** 	002	Measurement and Geometry
29	MC	C	002	Measurement and Geometry
30	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
31	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
32	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
33	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
34	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
35	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
36	MC	A	003	Probability, Statistics, Patterns, Functions, and Algebra

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
37	TEI	Commutative Property of Addition (the box located in the first row, second column) 	003	Probability, Statistics, Patterns, Functions, and Algebra
38	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
39	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
40	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
41	TEI	The top of the bar for the temperature interval 7-8 should be at 1. The top of the bar for the temperature interval 9-10 should be at 3. The top of the bar for the temperature interval 11-12 should be at 4. The top of the bar for the temperature interval 13-14 should be at 2. All bars must be raised to the correct heights. 	003	Probability, Statistics, Patterns, Functions, and Algebra
42	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
43	MC	A	003	Probability, Statistics, Patterns, Functions, and Algebra
44	MC	B	003	Probability, Statistics, Patterns, Functions, and Algebra
45	MC	A	003	Probability, Statistics, Patterns, Functions, and Algebra
46	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra
47	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
48	MC	D	003	Probability, Statistics, Patterns, Functions, and Algebra
49	MC	B	003	Probability, Statistics, Patterns, Functions, and Algebra
50	MC	C	003	Probability, Statistics, Patterns, Functions, and Algebra

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.

Spring 2014 Released
Grade 7 Mathematics Standards of Learning Test
Total Raw Score to Scaled Score Conversion Table

Total Raw Score If you get this many items correct:	**Total Scaled Score** Then your converted scaled score is:
0	0
1	152
2	189
3	211
4	227
5	241
6	252
7	262
8	270
9	278
10	286
11	293
12	299
13	305
14	311
15	317
16	322
17	328
18	333
19	338
20	343
21	348
22	353
23	358
24	363
25	368
26	373
27	377
28	382
29	387
30	392
31	397
32	**402**
33	408
34	413
35	419
36	425
37	431
38	437
39	444
40	451
41	458
42	466
43	475
44	485
45	497
46	**510**
47	527
48	549
49	587
50	600

A **total raw score** (left column) is converted to a **total scaled score** (right column). The total scaled score may range from 0 to 600.

A scaled score of 400 or more means the student passed the SOL test, while a scaled score of 399 or less means the student did not pass the test. A scaled score of 500 or more indicates the student passed the SOL test at an advanced level.

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