INSTRUCTIONAL MATERIALS
for the Criterion Referenced Test
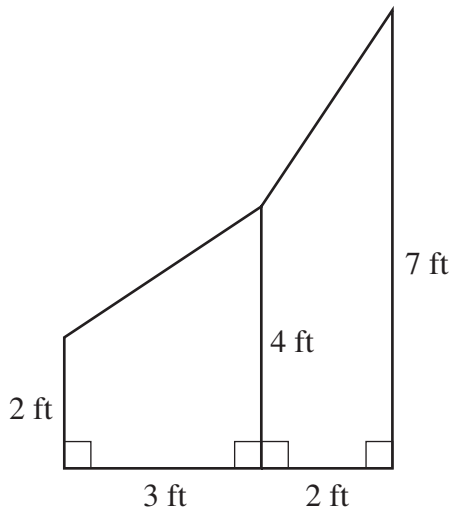
MATHEMATICS
GRADE 6

1 Kyle has 27 black marbles and 18 red marbles in a box. What is the ratio of the number of black marbles to the number of red marbles in the box?
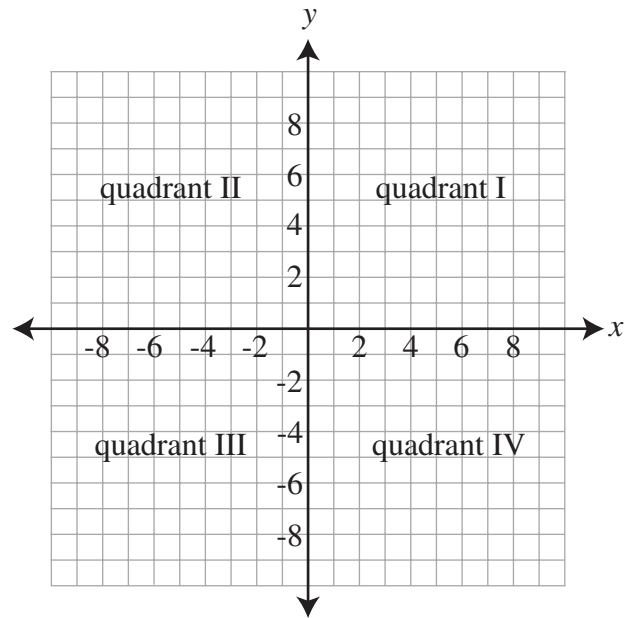
A 1 to 3
B 2 to 3
C 3 to 2
D 9 to 1

2 The figure below shows the dimensions of two tables that have been pushed together to form one surface.

Which expression can be used to determine the total area, in square feet, of the surface?

A $2(2 \bullet 3) + (2 \bullet 4)$

B $3(2 \bullet 3) + (2 \bullet 4)$

C $\frac{1}{2}(5 \bullet 5) + (2 \bullet 5)$

D $\frac{1}{2}(5 \bullet 5) + (2 \bullet 3) + (2 \bullet 4)$

3 A coordinate plane is shown below.

In which quadrant is the point (-3, -5) located?

A quadrant I
B quadrant II
C quadrant III
D quadrant IV

Go On

4 Lela creates a data set using the daily high temperatures in July. How would a measure of center help her describe the data in the set?

A It would describe the overall shape of the data.
B It would summarize the greatest value of the data.
C It would describe how the data vary over time.
D It would summarize all the data with a single number.

5 An expression is shown below.

$$\frac{5+5}{2+3}$$

The value of the expression can be described as the quotient of which two numbers?

A 10 and 5
B 10 and 2
C 5 and 3
D 2 and 3

6 Four of Ms. Lin's students guess the number of pennies in a jar. Ms. Lin uses the number line below to show how much less or how much more each student's guess is than the actual number of pennies in the jar.
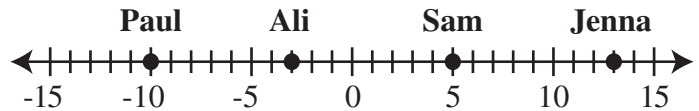
Which student's guess is **closest** to the actual number of pennies in the jar?

A Paul
B Ali
C Sam
D Jenna

Go On

> **Write your answer to Question 7 on a separate sheet of paper. Be sure to answer Parts A and B.**

7 Jennifer has a bag of soil that is $\frac{3}{4}$ full. She puts $\frac{1}{12}$ of a full bag of soil into each of several flower boxes.

A How many flower boxes can Jennifer put soil into using all the soil she has? Show your work or explain your thinking.

B Each flower box is in the shape of a rectangular prism.

• The volume of soil each flower box can hold when it is full is $\frac{1}{4}$ cubic foot.

• The area of the base of each flower box is $\frac{3}{8}$ square foot.

• After Jennifer puts soil into the flower boxes, they are each $\frac{7}{8}$ full.

How deep is the soil in each flower box? Show your work **and** explain your thinking.

Go On

8 An expression is shown below.

$$4h^2 + 2$$

What is the value of the expression when $h = 3$?

A   26
B   38
C   146
D   324

9 Marta is using positive and negative numbers to describe locations along a street. She describes a location 6 yards to the right of a light pole as 6 . How would Marta **most** likely describe a location 12 yards to the left of the light pole?

A -12
B   -6
C   6
D   12

10 Divide:

$$\frac{3}{4} \div \frac{7}{8}$$

A $\frac{1}{8}$

B $\frac{3}{14}$

C $\frac{6}{7}$

D $1\frac{1}{6}$

11 There are 6 gallons of gas in a tank that is 20% full. How many gallons of gas are in a full tank?

A 12 gallons
B 14 gallons
C 24 gallons
D 30 gallons

Go On

12 In which situation would the **median** most likely be considered a better measure of center than the **mean**?

A the typical depth at which a type of fish swims when the fish usually swim in schools at the same depth

B the typical cost of a house in a town where most houses are about the same cost but a few are much more expensive

C the typical height of a member of a basketball team when all the team members are much taller than people of average height

D the typical number of apples produced by a tree in an orchard where most trees produce apples but some trees are too old to produce

13 Lisa is building a birdhouse in the shape of a square pyramid. The net below represents the design of the birdhouse before it is put together.
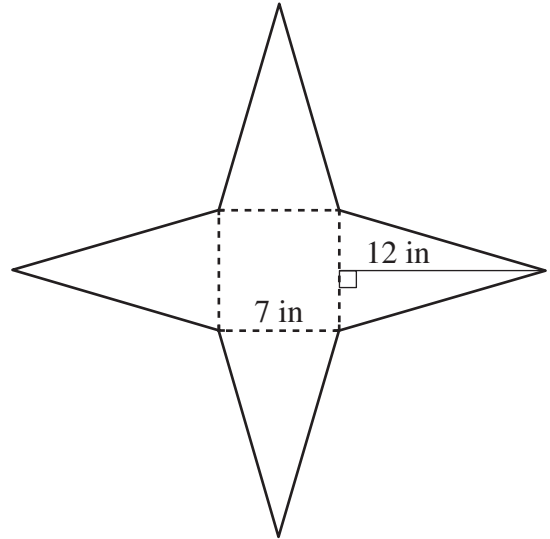

Lisa cuts out the design of the birdhouse from a rectangular piece of wood that measures 36 in by 32 in. What is the area of the wood that remains after Lisa cuts out the design?

A 767 in^2
B 815 in^2
C 935 in^2
D 977 in^2

Go On

Page 6

> **Write your answer to Question 14 on a separate sheet of paper. Be sure to answer Parts A and B.**

14 The locations of a school, a library, a house, and a store can all be shown on the same coordinate plane. The location of the school is shown on the coordinate plane below.
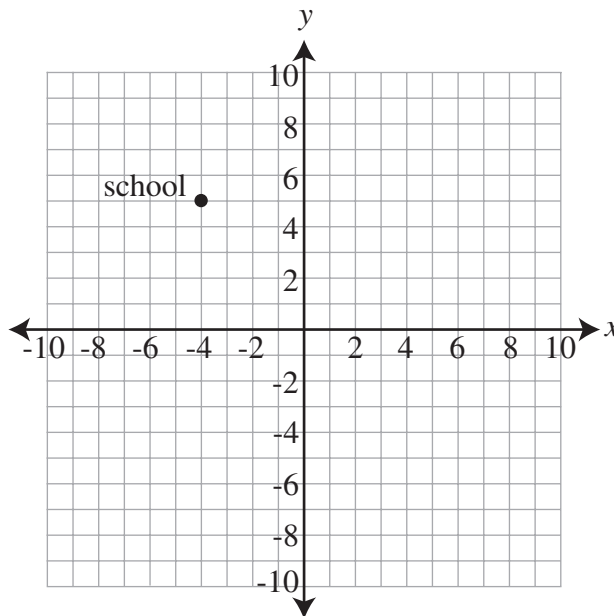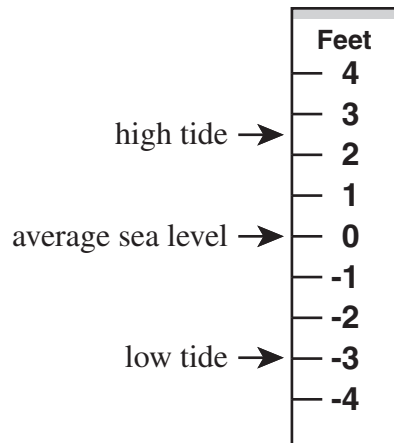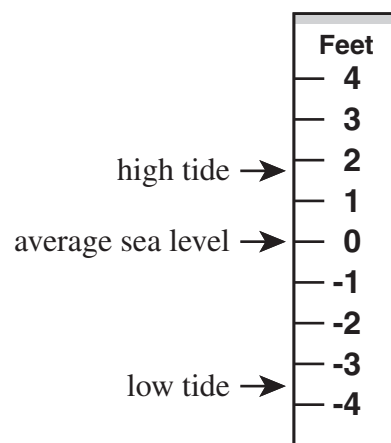

The ordered pair (3, -2) describes the location of the library. The absolute value expression $|-4| + |3|$ describes both the distance from the school to the house and the distance from the library to the house.

A What are two ordered pairs that each describe a possible location of the house? Show your work or explain your thinking.

B The store is located 2 units from the school and lies along grid lines on the coordinate plane. It is the maximum distance it can be from either possible house location in **Part A**. Determine two ordered pairs that each describe a possible location of the store **and** write two absolute value expressions that could describe the distance, in units, from either house location to the store. Explain your thinking.

Go On

15 Today's high tide is more than 2 feet above average sea level. Today's low tide is more than 2 feet below average sea level. Which diagram could represent today's high and low tides?

A

Feet
4
3
2
1
0
-1
-2
-3
-4

high tide → (between 2 and 3)
average sea level → 0
low tide → -3

C

Feet
4
3
2
1
0
-1
-2
-3
-4

high tide → 2
average sea level → 0
low tide → (between -3 and -4)

B

Feet
4
3
2
1
0
-1
-2
-3
-4

high tide → (between 3 and 4)
average sea level → 0
low tide → -1

D

Feet
4
3
2
1
0
-1
-2
-3
-4

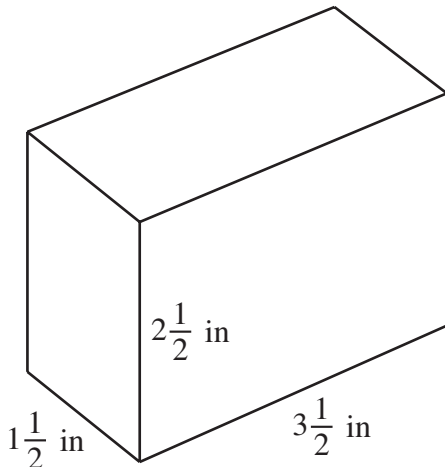high tide → 1
average sea level → 0
low tide → -1

Go On
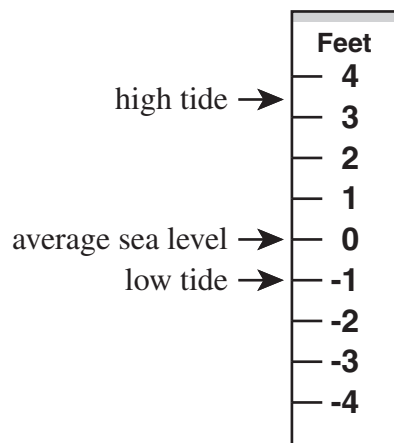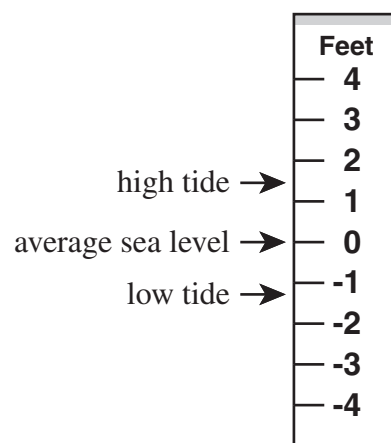
16 Add:

$$29.7 + 3.583$$

A 22.283
B 33.283
C 38.8
D 65.53

17 Michelle buys a box shaped like a rectangular prism. The dimensions of the box are shown in the picture below.

$2\frac{1}{2}$ in

$1\frac{1}{2}$ in

$3\frac{1}{2}$ in

Cora buys a box shaped like a rectangular prism that is 1 in longer, 1 in wider, and 1 in taller than the box Michelle buys. What is the difference between the volumes of the two boxes?

A 1 in³

B 3 in³

C $18\frac{1}{8}$ in³

D $26\frac{1}{4}$ in³

18 What is the value of the expression $4 + 2^3$?

A 10
B 12
C 18
D 22

19 Sasha bikes 54 miles in 3 hours. At what average rate does Sasha bike?

A 6 miles per hour
B 9 miles per hour
C 18 miles per hour
D 27 miles per hour

20 Coach Zucker counts the number of laps each student in his gym class runs on Friday. He records the data shown below.

| 1 | 2 | 5 | 3 | 4 | 2 | 1 | 4 | 4 | 3 | 5 |
| 5 | 3 | 3 | 4 | 2 | 2 | 1 | 4 | 3 | 2 | 3 |

Which statement **best** describes the overall shape of the distribution of the number of students who ran each number of laps?

A The number of students is evenly distributed.
B The number of students is symmetrical about a peak.
C The number of students increases gradually as the number of laps increases.
D The number of students decreases steeply as the number of laps increases.

Go On

> **Write your answer to Question 21 on a separate sheet of paper. Be sure to answer Parts A and B.**

21 The figure below shows triangle *FBD* drawn inside rectangle *ACDE* .
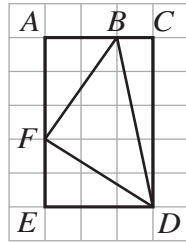
A   What is the area, in square units, of triangle *FBD* ? Show your work or explain your thinking.

B   Trapezoid *RSTY* is shown below.
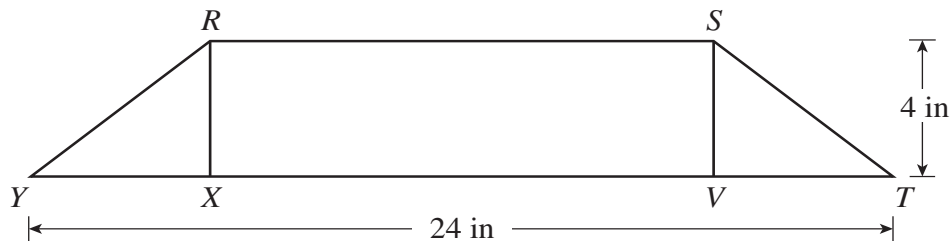
• The area of rectangle *RSVX* is 56 square inches.

• The length of $\overline{YX}$ is the same as the length of $\overline{VT}$.

Explain why the area of trapezoid *RSTY* is the sum of the area of rectangle *RSVX* and the area of a rectangle that measures 5 inches by 4 inches. As part of the explanation, determine the area, in square inches, of trapezoid *RSTY* .

Go On

22 Which number line shows a point located at the **opposite** of -6 ?

A

```
← +——+——+——+——+——+——+——+——+——+——+——+——+——+ →
  -6  -5  -4  -3  -2  -1   0   1   2   3   4   5   6
                                                  ●
```

B

```
← +——+——+——+——+——+——+——+——+——+——+——+——+——+ →
  -6  -5  -4  -3  -2  -1   0   1   2   3   4   5   6
                           ●
```

C

```
← +——+——+——+——+——+——+——+——+——+——+——+——+——+ →
  -6  -5  -4  -3  -2  -1   0   1   2   3   4   5   6
              ●
```

D

```
← +——+——+——+——+——+——+——+——+——+——+——+——+——+ →
  -6  -5  -4  -3  -2  -1   0   1   2   3   4   5   6
      ●
```
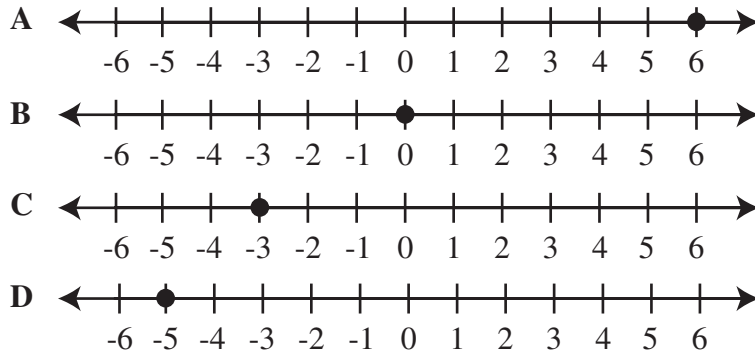
23 There are 72 girls and 90 boys who attend a school. What is the ratio of the number of girls to the total number of students who attend the school?

    A 4:5
   **B** 4:9
    C 5:9
    D 9:1

24 Which of these is **best** described as a statistical question?

    A What number of miles did Tonya run last month?
    B How many students rode the bus to school on Monday?
    C What scores did Samantha and Ryan receive on the math test?
    D How many hours did each student in Mr. Smith's class spend on homework last week?

Go On

25 What is 6,336 divided by 454 ?

    A   10 r179
    B   13 r434
    C   14 r400
    D   16 r172

26 Which expression is equivalent to $6(a + 3c)$?

    A $6a + 2c$
    B $6a + 3c$
    C $6a + 18c$
    D $6 + a + 3c$

27 The box pictured below is shaped like a rectangular prism and does **not** have a top.

4 cm
5 cm
6 cm
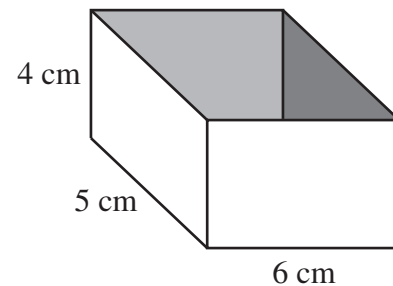
Tess covers the inside and outside of the box, including the bottom, with aluminum foil. How many square centimeters (cm^2) of foil does she use?
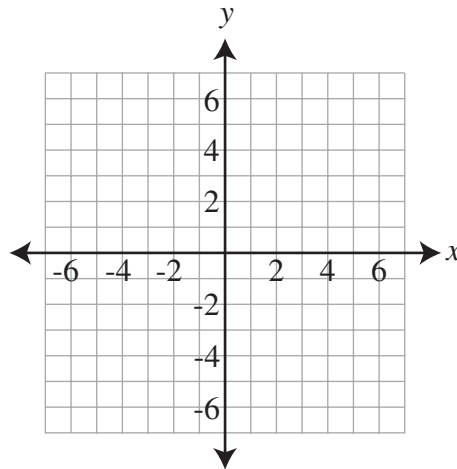
    A   148 cm^2
    B   206 cm^2
    C   236 cm^2
    D   248 cm^2

Go On

> **Write your answer to Question 28 on a separate sheet of paper. Be sure to answer Parts A and B.**

28 Triangle *RST* has vertices *R*(-4, 5), *S*(2, 3), and *T*(-4, 1) . The height of triangle *RST* is 6 units.

A Copy the coordinate plane shown below on a separate sheet of paper. Plot vertices *R*, *S*, and *T* on the coordinate plane and draw triangle *RST* .
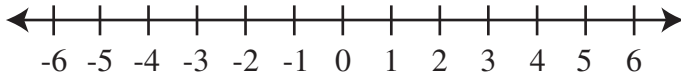

B Triangle *XYZ* has vertices *X*(-2, -4), *Y*(6, -4), and *Z*(?, ?) . The area of triangle *XYZ* is equal to the area of triangle *RST* . What ordered pair could describe the location of vertex *Z* ? Show your work **and** explain your thinking.

Go On

29 Divide:

$$32\overline{)64512}$$

A 2,016
B 2,136 r30
C 20,016
D 20,119 r2

30 A number line is shown below.

Which relationship among the numbers on the number line is true?

A -4 > -1
B -3 > 2
C -2 > 6
D -1 > -5

31 The list below shows the number of times each student in a class visited a library last month.

| 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |

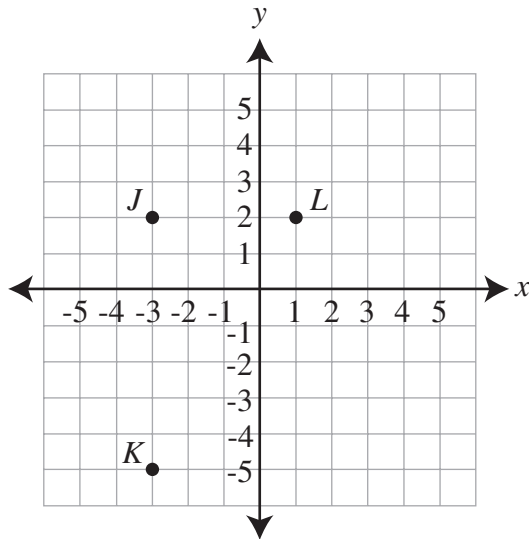Based on the information shown in the list, how many students are in the class?

A   5 students
B   6 students
C 20 students
D 39 students

32 Which expression is equivalent to $3(x + y)$?

A $3x + y$

B $3y + 3x$

C $\dfrac{x + y}{3}$

D $y + \dfrac{x}{3}$

Go On

33 The coordinate plane below shows the locations of three cones on a soccer field.

How much farther is cone *J* from cone *K* than from cone *L* ?

A   1 unit
B   2 units
C   3 units
D   4 units

34 What is the greatest common factor (GCF) of 36 and 90 ?

A   3
B   9
C   18
D   30

35 A rectangular prism has a length of $\frac{9}{4}$ inches, a width of $\frac{8}{4}$ inches, and a height of $\frac{6}{4}$ inches. A student completely fills the prism with cubes that measure $\frac{1}{4}$ inch on each side. The cubes do not overlap and have no gaps between them. How many $\frac{1}{4}$-inch cubes does it take to fill the prism?
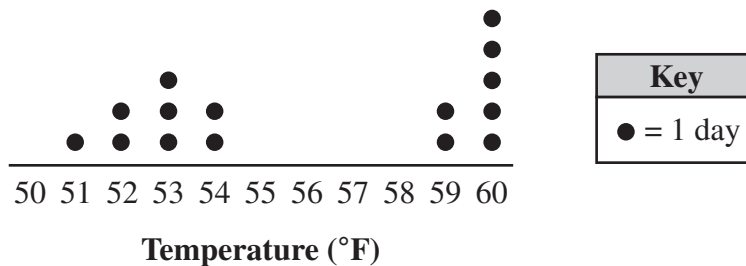
A   23 cubes
B   27 cubes
C   108 cubes
D   432 cubes

Go On

Write your answer to Question 36 on a separate sheet of paper. Be sure to answer Parts A and B.

36 The daily high temperatures for each of three 15-day periods are recorded. The dot plot below shows the daily high temperature on each of 15 days for period 1 .

Daily High Temperatures for Period 1

Temperature (°F)

A Explain why the **median** daily high temperature might be considered a better measure of center than the **mean** daily high temperature for this 15-day period.

B The dot plots below show the daily high temperatures for period 2 and period 3 .

### Daily High Temperatures for Period 2 and Period 3
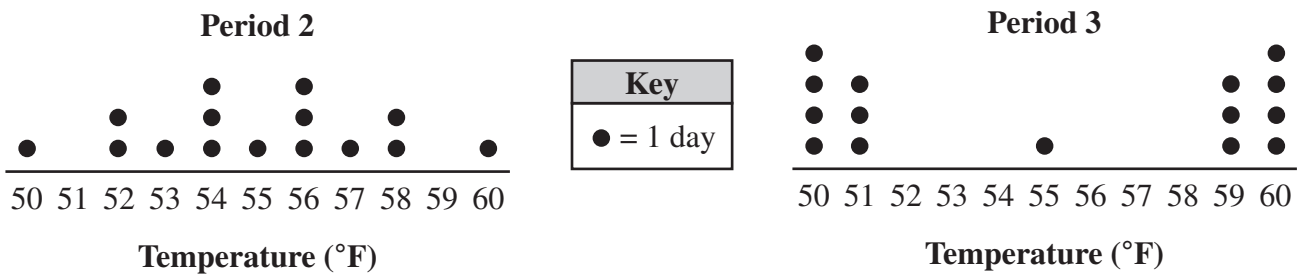
Without actually computing, explain why the measures of variability (interquartile range and mean absolute deviation) are **more** useful for describing the differences between the data for period 2 and period 3 than the measures of center (median and mean).

Go On

37 Alex buys a raffle ticket. The number on the ticket is divisible by both 6 and 4 . What is the **least** number that could be on the ticket?

A   8
B 12
C 18
D 24

38 Point *X* is shown on the number line below.
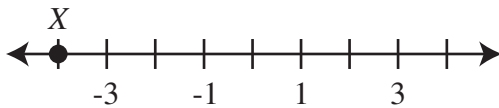
What is the location of point *X* ?

A -4
B -2
C   2
D   4

39 Three vertices of a square are graphed on the coordinate plane below.
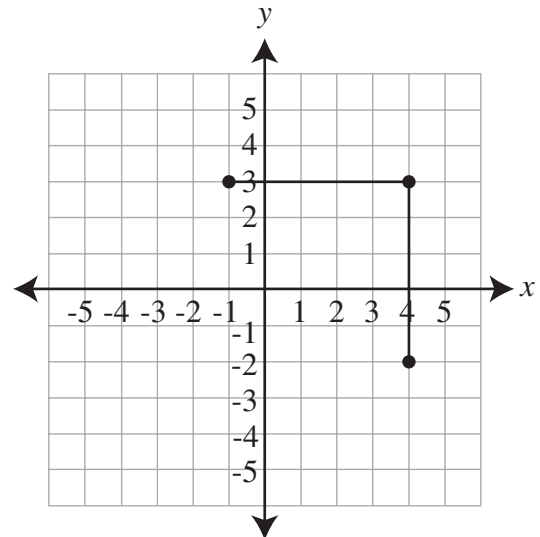
What is the perimeter of the square?

A 10 units
B 12 units
C 16 units
D 20 units

40 Which of these is **best** represented by a negative number?

A the temperature, in degrees Celsius, on a day that is below freezing
B the distance, in yards, a jogger travels around a track
C the change in the number of baseball cards in a growing collection
D the amount of money a worker earns painting a house

Go On

41 Luke's bird feeder holds $2\frac{2}{3}$ cups of seed. When he fills it with thistle seeds, birds eat $\frac{1}{6}$ cup each day. When he fills it with sunflower seeds, birds eat $\frac{4}{9}$ cup each day. How many **more** days does it take birds to empty the feeder when Luke fills it with thistle seeds than when he fills it with sunflower seeds?

A $\frac{20}{27}$ day

B 1 day

C $9\frac{3}{5}$ days

D 10 days

42 Robert made the table below to show the number of points he scored in each basketball game last season.

Points Robert Scored

| Game	Points
1	6
2	9
3	14
4	4
5	18
6	15
7	9
8	13
9	20

What is the **mean** number of points Robert scored in the games last season?

A 6 points
B 9 points
C 12 points
D 13 points

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Go On

Write your answer to Question 43 on a separate sheet of paper. Be sure to answer Parts A and B.

43 A net of a rectangular prism is pictured below.
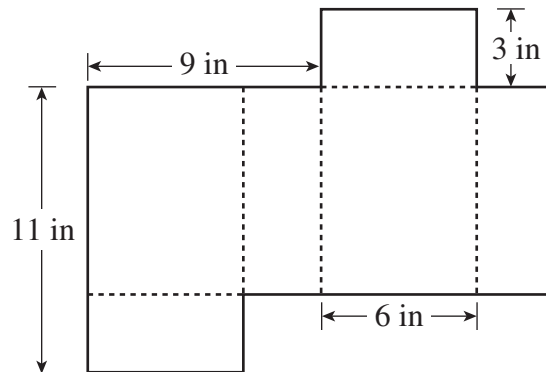
A What is the surface area, in square inches, of the rectangular prism? Show your work or explain your thinking.

B The base of a triangular prism is an isosceles triangle with two sides that are 5 in long. A net of the triangular prism, with some of its dimensions, is pictured below.
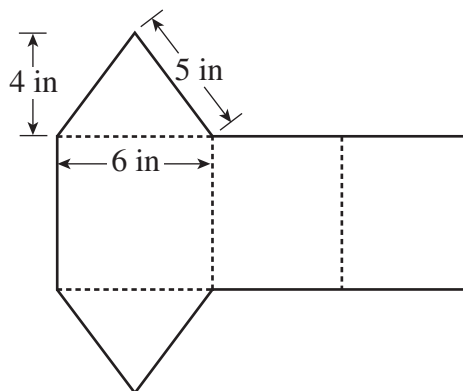
The surface area of the triangular prism is $\frac{2}{3}$ the surface area of the rectangular prism

from **Part A**. What is the distance, in inches, between the bases of the triangular prism?

Show your work **and** explain your thinking.

Go On

Correct Answers for Multiple-Choice Items

Item Level Data

Percentage of Students Selecting a Given Response

Item Number	NVACS*	DOK	P-value	A	B	C	D
1	6.RP.1	1	0.53	9%	18%	53% ✓	20%
2	6.G.1	2	0.38	38% ✓	28%	14%	19%
3	6.NS.6b	1	0.89	3%	5%	89% ✓	3%
4	6.SP.3	1	0.18	16%	22%	44%	18% ✓
5	6.EE.2b	1	0.76	76% ✓	9%	10%	5%
6	6.NS.7c	2	0.37	5%	37% ✓	14%	43%
7	6.NS.1	3	N/A	---	---	---	---
8	6.EE.2c	1	0.37	22%	37% ✓	36%	5%
9	6.NS.5	1	0.50	50% ✓	19%	12%	18%
10	6.NS.1	1	0.38	25%	17%	38% ✓	19%
11	6.RP.3c	2	0.48	16%	14%	22%	48% ✓
12	6.SP.5d	2	0.32	16%	32% ✓	34%	18%
13	6.G.4	2	0.17	32%	33%	17% ✓	17%
14	6.NS.8	3	N/A	---	---	---	---
15	6.NS.7d	2	0.50	50% ✓	11%	17%	22%
16	6.NS.3	1	0.74	5%	74% ✓	14%	7%
17	6.G.2	2	0.14	24%	38%	24%	14% ✓
18	6.EE.1	1	0.63	25%	63% ✓	8%	4%
19	6.RP.2	1	0.79	6%	8%	79% ✓	7%
20	6.SP.2	2	0.24	19%	24% ✓	27%	29%
21	6.G.1	3	N/A	---	---	---	---
22	6.NS.6a	1	0.88	88% ✓	5%	3%	4%

* Nevada Academic Content Standards

P-value is the proportion of students who got the item correct

✓ = Correct Answer

Correct Answers for Multiple-Choice Items (continued)

Item Level Data

Percentage of Students Selecting a Given Response

Item Number	NVACS*	DOK	P-value	A	B	C	D
23	6.RP.1	2	0.32	28%	32% ✓	23%	17%
24	6.SP.1	1	0.44	16%	19%	21%	44% ✓
25	6.NS.2	1	0.56	13%	56% ✓	19%	11%
26	6.EE.3	1	0.16	6%	59%	16% ✓	19%
27	6.G.4	2	0.24	36%	27%	24% ✓	13%
28	6.G.3	3	N/A	---	---	---	---
29	6.NS.2	1	0.62	62% ✓	15%	14%	9%
30	6.NS.7a	1	0.61	18%	10%	11%	61% ✓
31	6.SP.5a	1	0.51	3%	3%	51% ✓	43%
32	6.EE.3	1	0.28	47%	28% ✓	18%	7%
33	6.NS.8	1	0.46	7%	14%	46% ✓	32%
34	6.NS.4	1	0.41	18%	29%	41% ✓	12%
35	6.G.2	2	0.14	31%	29%	25%	14% ✓
36	6.SP.5d	3	N/A	---	---	---	---
37	6.NS.4	2	0.62	18%	62% ✓	7%	13%
38	6.NS.6c	1	0.77	77% ✓	15%	5%	3%
39	6.G.3	2	0.49	20%	15%	15%	49% ✓
40	6.NS.5	1	0.79	79% ✓	8%	7%	6%
41	6.NS.1	2	0.18	18%	29%	34%	18% ✓
42	6.SP.5c	1	0.54	8%	20%	54% ✓	18%
43	6.G.4	3	N/A	---	---	---	---

* Nevada Academic Content Standards

✓ = Correct Answer

P-value is the proportion of students who got the item correct

Detailed objectives for Content Standards and Depth of Knowledge (DOK) descriptions can be found on the Nevada Department of Education web site.