## Mathematics

**DIRECTIONS**

Read and solve each question. Then mark the space in the answer booklet for the best answer.

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**SAMPLE**

Vicki had $228 in her checking account. She used $37 to buy a birthday gift for her grandmother. After that, how much did she have left in her checking account?

A   $211

B   $191

C   $181

D   $164

---

**1**   If $0.3 < x < 35\%$, which of the following could be the value of $x$?

A   $\dfrac{1}{4}$

B   $\dfrac{1}{3}$

C   $\dfrac{1}{2}$

D   1

**2**   What is the value of $3 + 7(2^3 - 6)^2$?
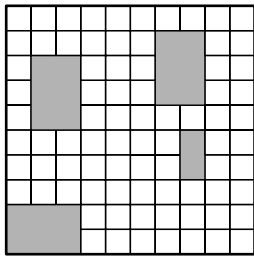
F   23

G   31

H   84

J   2,503

**3**   A scale distance of 3.5 centimeters on a certain map represents an actual distance of 175 kilometers. What actual distance does 5.7 centimeters on the same map represent?

A   0.285 km

B   2.85 km

C   28.5 km

D   285 km

**4**   Which of the following is *not* a prime number?

F   2

G   5

H   17

J   121

GO ON

**5**



The shaded part of the square can be expressed by —

A   0.02

B   20%

C   $\dfrac{1}{4}$

D   $\dfrac{2}{5}$

**6**   Mia has 90 roses and 135 carnations to put into vases. She wants to put the same number of roses and the same number of carnations into each vase. What is the *greatest* number of vases that she will need in order to do this?

F   5

G   9

H   15

J   45

**7**   Which is closest to the location of point *A* on the number line?
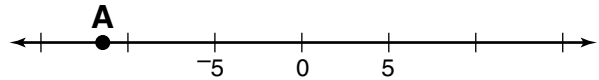


A   ⁻11

B   ⁻7

C   7

D   11

**8**   Which is an example of the associative property of multiplication?

F   $7 \cdot 0 \cdot 9 = 0$

G   $4 \cdot (7 \cdot {}^-3) = 4 \cdot ({}^-3 \cdot 7)$

H   $\left(6 \cdot \dfrac{1}{6}\right) \cdot 3 = 3$

J   $5 \cdot (3 \cdot {}^-8) = (5 \cdot 3) \cdot {}^-8$

**9**   Johanna rented a car. Rental costs were $29.00 per day plus $0.49 for each mile driven. If she kept the car for 1 day and drove 50 miles, how much did she owe?

A   $29.49

B   $31.45

C   $53.50

D   $78.00

**10** Randy makes $200 per week. His employer deducts 4% of his earnings for Randy's medical insurance. How much of his weekly salary does Randy pay for medical insurance?

   **F**  $80

   **G**  $8

   **H**  $0.80

   **J**  $0.08

**11** Between which two consecutive whole numbers does $\sqrt{42}$ lie?

   **A**  5 and 6

   **B**  6 and 7

   **C**  7 and 8

   **D**  8 and 9

**12** What is the value of $x^2(7 - x) + 2$ when $x = 5$?

   **F**  52

   **G**  100

   **H**  152

   **J**  172

**13** Mrs. Adams walks between $\dfrac{4}{10}$ and $\dfrac{6}{10}$ mile every day. Which is the *best* estimate of the number of miles she will walk in 30 days?

   **A**  12

   **B**  15

   **C**  18

   **D**  20

**14** Chris used a copy machine to enlarge a drawing to 150% of its original size. If the width of the original drawing was 37 centimeters, what is the width of the copy of the drawing?

   **F**  37.0 cm

   **G**  55.5 cm

   **H**  92.5 cm

   **J**  150.0 cm

**15** Pure water boils at 212° F. If a certain chemical is added to the water, the boiling point changes by ⁻28° F. At what temperature does the new liquid boil?

   **A**  240° F

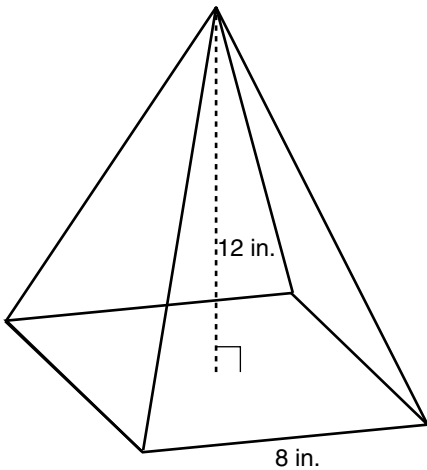   **B**  184° F

   **C**  ⁻184° F

   **D**  ⁻240° F

**16** If Gina measured the length of all 4 sides of the top of her desk and added them together, what would she have?

F   The diameter

G   The volume

H   The perimeter

J   The area

**17** The angles in Δ *ABC* measure 27°, 73°, and 80°. What kind of triangle is Δ *ABC*?
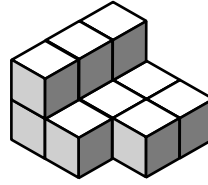
A   Equiangular

B   Acute

C   Obtuse

D   Right

**18** What is the volume of the square-based pyramid shown below?



12 in.

8 in.

F   96 cu in.
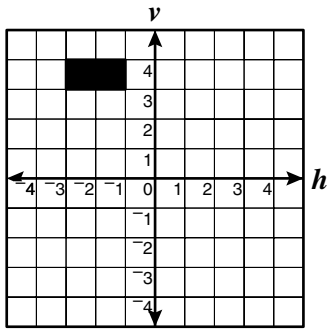
G   256 cu in.

H   384 cu in.

J   768 cu in.

**19** Each cube in this stack has a volume of 1 cubic unit, and each face of those cubes has an area of 1 square unit.
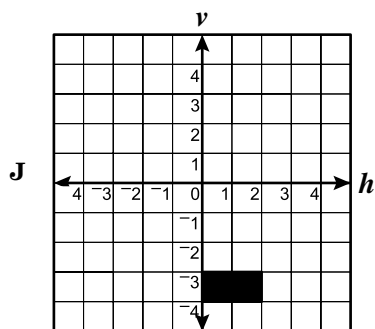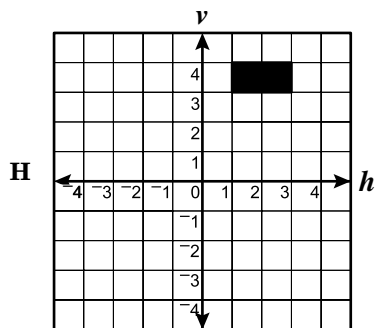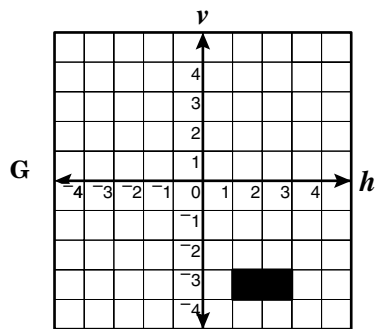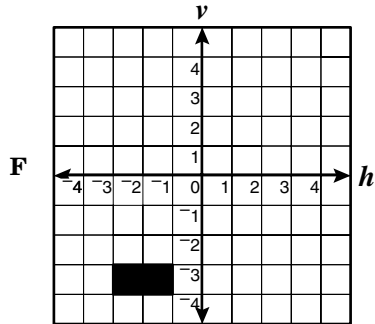


Which could be the surface area of this stack of cubes?

A   18 sq units

B   24 sq units

C   29 sq units

D   36 sq units

**20**



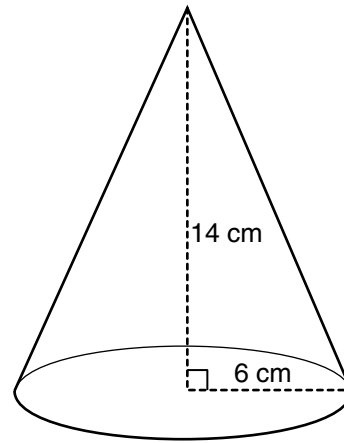The dark rectangle is reflected over line *v*. Which shows this reflection?
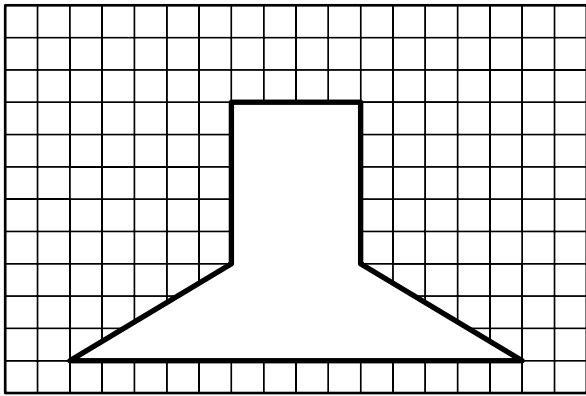
F



G



H



J



**21**



14 cm

6 cm

Which is *closest* to the volume of the cone shown above?

A   87.9 cm$^3$

B   395.6 cm$^3$

C   527.5 cm$^3$

D   1582.6 cm$^3$

**22** Which is the *closest* to the circumference of a circle with a radius of 2.4 meters?
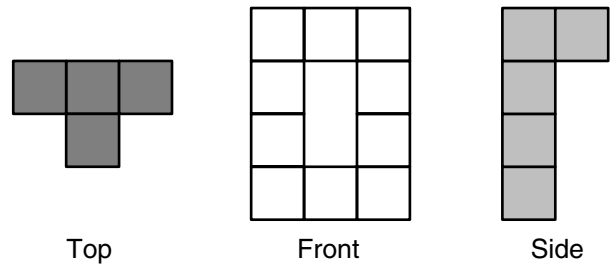
F   7.5 m

G   15.1 m

H   18.1 m

J   72.3 m

**23** **In this scale drawing, each square unit represents 1 square centimeter.**
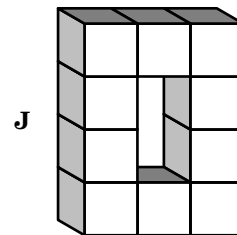


**What is the area of the figure represented by the drawing?**

**A** 15 cm$^2$

**B** 20 cm$^2$

**C** 32 cm$^2$

**D** 47 cm$^2$

**24**



Top                 Front                 Side

**This shows 3 different views of a three-dimensional figure constructed from cubes. Which could be this figure?**

**F**



**G**



**H**



**J**
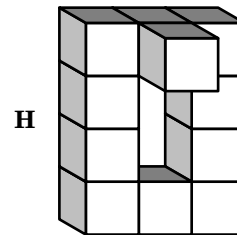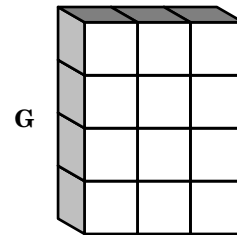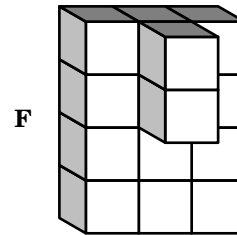
**25** In △ *ABC*, $\overline{AB}$ measures 6 centimeters and $\overline{BC}$ measures 8 centimeters.
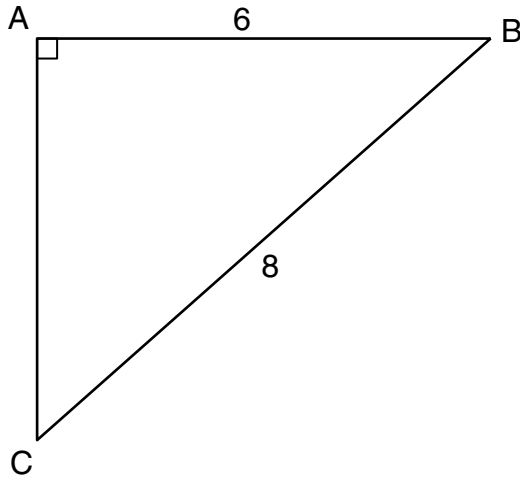


What is the length of $\overline{AC}$?

A   1.41 cm

B   2 cm

C   5.29 cm

D   10 cm

**26**



These figures are all —

F   pyramids

G   prisms

H   cylinders

J   cones

**27**



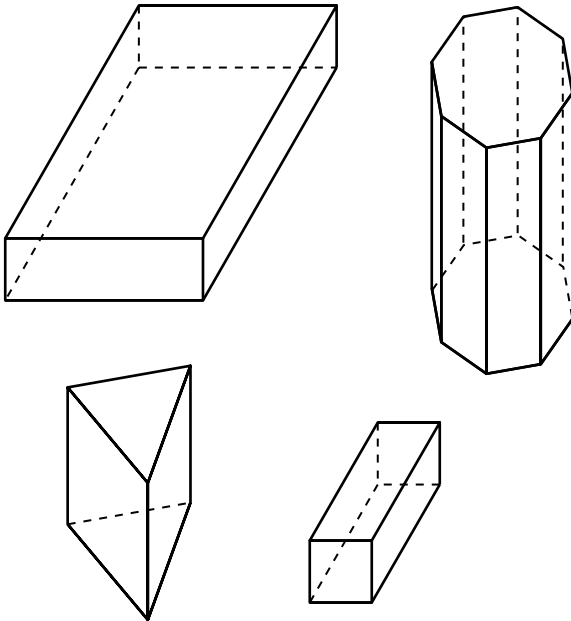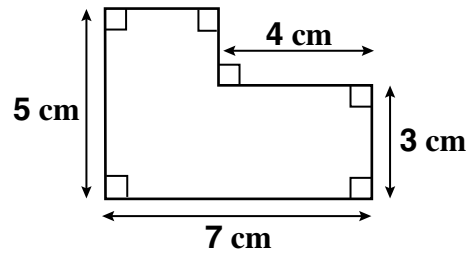What is the area of this figure?

A   19 cm$^2$

B   24 cm$^2$

C   27 cm$^2$

D   35 cm$^2$

GO ON

**28** This shows three different views of a three-dimensional figure constructed from cubes.



| Top | Front | Side |
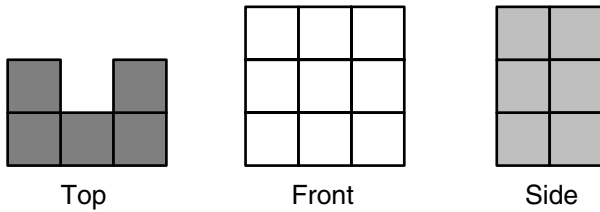
Which of the following could be the figure?

**F**



**G**



**H**



**J**
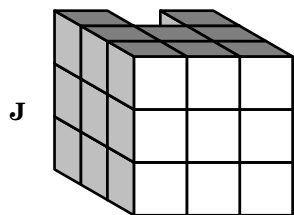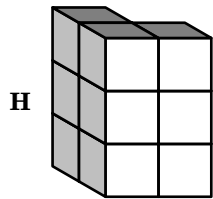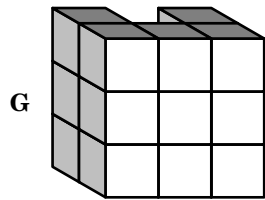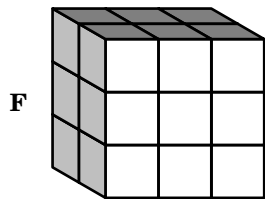


**29** If ∠QRS and ∠XYZ are complementary, which *must* be true?

**A** One of the angles can measure between 90° and 180°.

**B** The sum of the measures of the angles is 90°.

**C** The sum of the measures of the angles is 180°.

**D** Both angles must measure more than 90°.

**30**
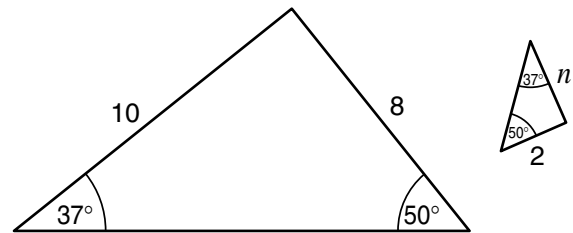


What is the length of side *n* on the second triangle?

**F** 2
**G** 2.5
**H** 4
**J** 5

**31** Ada and Jim received awards for placing either first, second, or third in their respective divisions at each of the 12 track meets attended by the team. The table indicates the results.

| Meet # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ada | 1st | 1st | 2nd | 3rd | 1st | 1st | 2nd | 2nd | 1st | 1st | 3rd | 1st |
| Jim | 2nd | 2nd | 1st | 1st | 3rd | 2nd | 3rd | 1st | 2nd | 1st | 1st | 1st |

**Which matrix *best* organizes the information in the table?**

A
$$\begin{array}{c} \\ 1st \\ 2nd \\ 3rd \end{array} \begin{array}{cc} \text{Ada} & \text{Jim} \\ \left[\begin{array}{cc} 6 & 7 \\ 4 & 3 \\ 2 & 2 \end{array}\right] \end{array}$$

B
$$\begin{array}{c} \\ 1st \\ 2nd \\ 3rd \end{array} \begin{array}{cc} \text{Ada} & \text{Jim} \\ \left[\begin{array}{cc} 7 & 6 \\ 4 & 3 \\ 2 & 2 \end{array}\right] \end{array}$$

C
$$\begin{array}{c} \\ 1st \\ 2nd \\ 3rd \end{array} \begin{array}{cc} \text{Ada} & \text{Jim} \\ \left[\begin{array}{cc} 7 & 6 \\ 3 & 4 \\ 2 & 2 \end{array}\right] \end{array}$$

D
$$\begin{array}{c} \\ 1st \\ 2nd \\ 3rd \end{array} \begin{array}{cc} \text{Ada} & \text{Jim} \\ \left[\begin{array}{cc} 6 & 6 \\ 5 & 3 \\ 2 & 2 \end{array}\right] \end{array}$$

**32** The table shows the Math and English scores of Art and 4 of his friends.

| Student | Math | English |
|---|---|---|
| Art | 84 | 78 |
| Bonnie | 67 | 76 |
| Cathy | 92 | 85 |
| Don | 75 | 75 |
| Ellie | 78 | 88 |

**Which scattergram correctly shows the relationship between Math and English scores for the group of friends?**

F


G


H


J
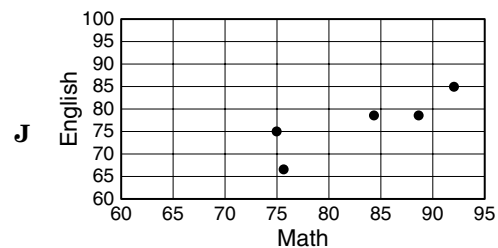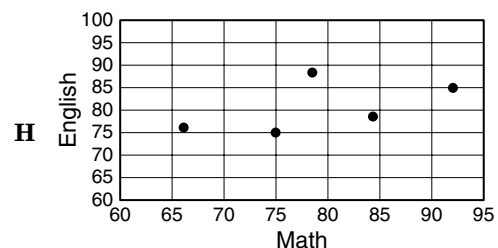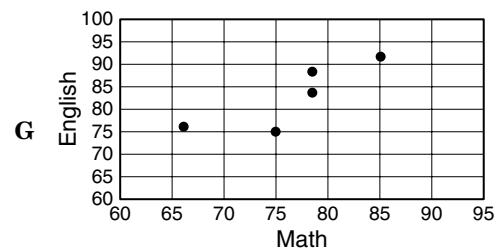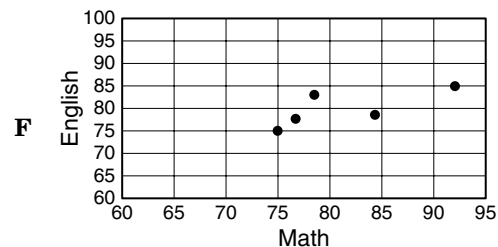
**33** Maria's test scores for the grading period are 78, 50, 80, 83, 81, and 50. Which measure would report the highest result?

A   Mean

B   Median

C   Mode

D   Range

**34** The graph shows the amount of money earned per week by 5 students in their summer jobs.

**Summer Earnings**
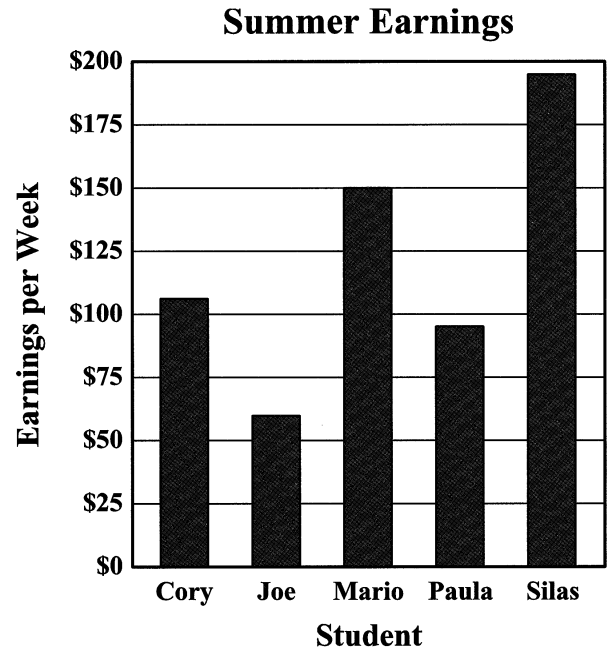


Tynan earned $80 per week more than Silas. Which could be her weekly salary?

F   $115

G   $250

H   $275

J   $290

**35** The list shows the scores made by each member of Jaime's discussion group on the last test.

69   79   62   93   73   81   73   78

Which box-and-whiskers plot correctly displays the information?

A



50   60   70   80   90   100

B



50   60   70   80   90   100

C



50   60   70   80   90   100

D



50   60   70   80   90   100
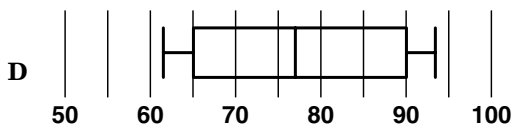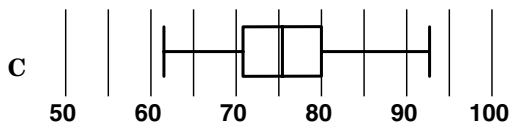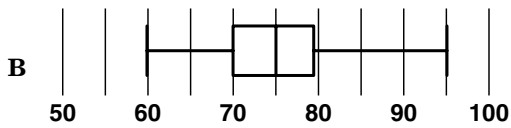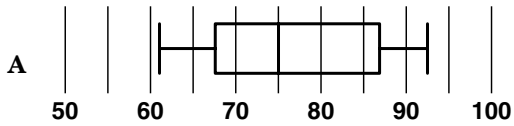
**36** This is a list of Beth's English homework scores for the grading period.

93, 83, 64, 84, 76, 83, 78, 76, 60, 81

Which stem-and-leaf plot correctly displays the information?

F

| Stem | Leaf |
|------|------|
| 6 | II |
| 7 | III |
| 8 | IIII |
| 9 | I |

G

| Stem | Leaf |
|------|------|
| 6 | 4 |
| 7 | 6, 8 |
| 8 | 1, 3, 4 |
| 9 | 3 |

H

| Stem | Leaf |
|------|------|
| 6 | 4 |
| 7 | 6, 6, 8 |
| 8 | 1, 3, 3, 4 |
| 9 | 3 |

J

| Stem | Leaf |
|------|------|
| 6 | 0, 4 |
| 7 | 6, 6, 8 |
| 8 | 1, 3, 3, 4 |
| 9 | 3 |

— 13 —

**37** The graph shows the number of books checked out at the public library each day last week.

## Books Checked Out

| Monday | 📗 📗 📗 |
|---|---|
| Tuesday | 📗 📗 |
| Wednesday | 📗 📗 📗 |
| Thursday | 📗 |
| Friday | 📗 📗 📗 📗 📗 |
| Saturday | 📗 📗 📗 📗 📗 📗 |
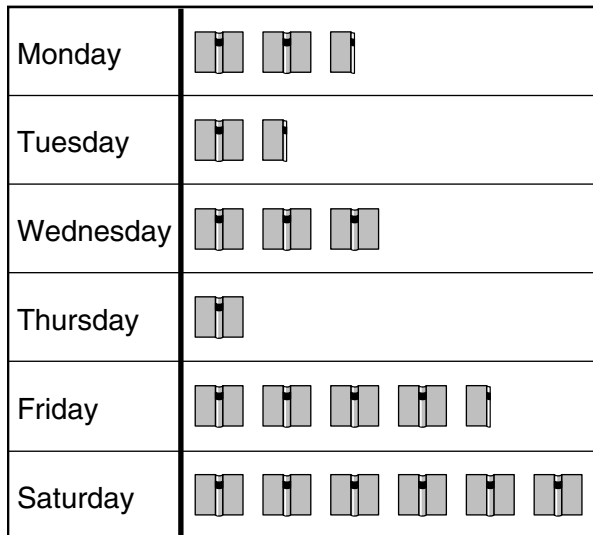
Each 📗 represents 10 Books

On which day were there 3 times as many books checked out as on Tuesday?

A  Wednesday
B  Thursday
C  Friday
D  Saturday

**38** Joan and Barry are candidates for class president. Orville, Sally, Consuela, Harry, and Rebecca are candidates for vice president. Sam, William, and Frederica are candidates for secretary. How many different combinations of president, vice president, and secretary are possible?

F  11
G  18
H  30
J  40

**39** Dave is a member of a bowling league. The table below shows his record for the last 10 games (100 frames) he bowled.

### Dave's Bowling Results

| Type of Ball | Number of Frames |
|---|---|
| Strike | 12 |
| Spare | 26 |
| Gutter ball | 3 |
| Other | 59 |

Based on his previous record, what is the probability that Dave will bowl a strike in the next frame?

A  $\dfrac{3}{100}$

B  $\dfrac{3}{50}$

C  $\dfrac{3}{25}$

D  $\dfrac{6}{25}$

GO ON

**40**

**Gambit Novelty Sales**
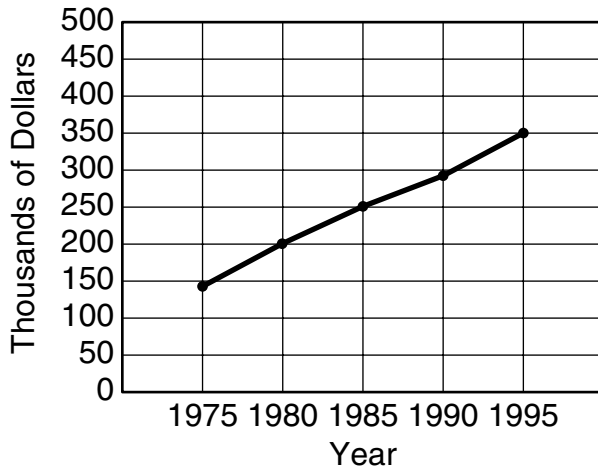


The graph shows the annual sales for the Gambit Novelty Company since 1975. Which is the *best* prediction for sales in the year 2005?

F  $375,000

G  $400,000

H  $425,000

J  $450,000

**41**  Rhea took a survey of the students in her class to find out about their career interests. The results are shown in the graph.

**Favorite Careers**
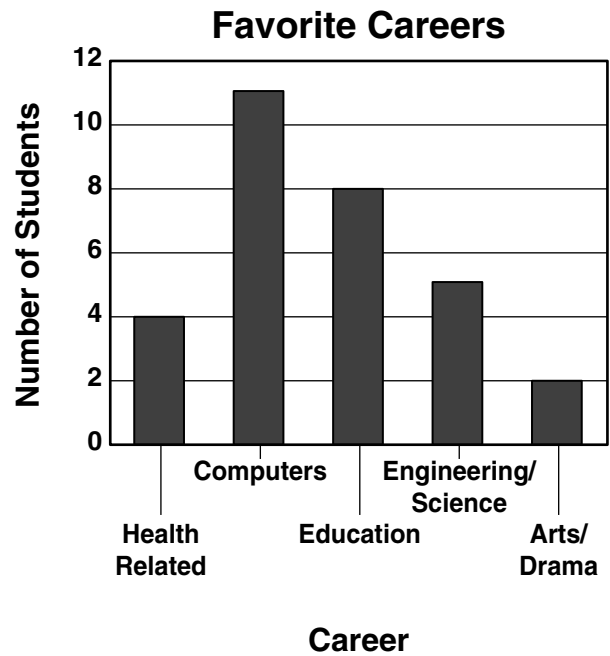


The mode of the data is associated with which career?

A  Health Related

B  Engineering/Science

C  Education

D  Computers

**42**
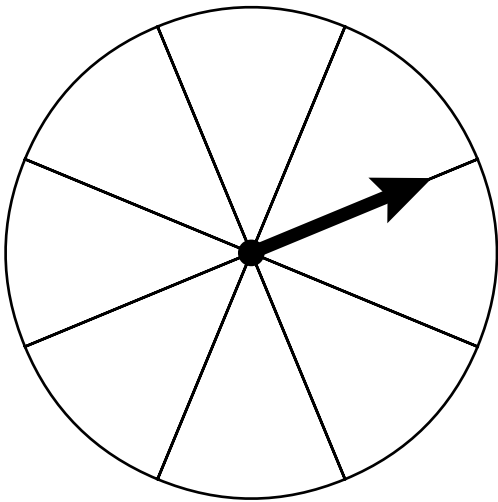


How many of the sections of the spinner shown above should be colored blue in order to make the probability of the arrow landing on blue 0.375 in a single spin?

**F**   1

**G**   3

**H**   5

**J**   7

**43**   Working together, Joy and Steve collected 39 pounds of aluminum cans for recycling. If Joy collected $j$ pounds, which of the following shows the number of pounds collected by Steve?

**A**   $j + 39$

**B**   $j - 39$

**C**   $39 - j$

**D**   $39\,j$

**44**
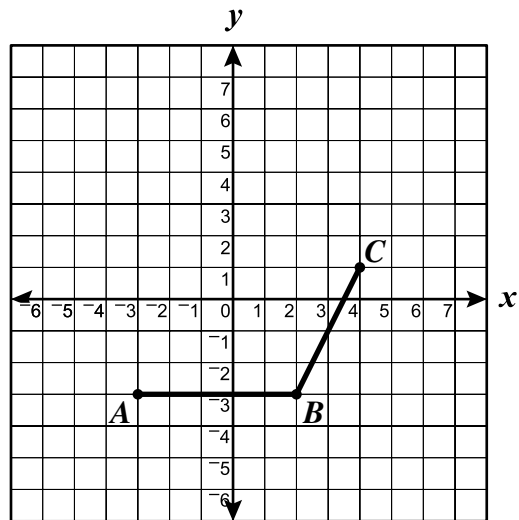


Points *A, B,* and *C* are vertices of a parallelogram. What are the coordinates of the fourth vertex?

**F**   $(0, 0)$

**G**   $(0, 1)$

**H**   $(^-1, 1)$

**J**   $(^-1, ^-1)$

**45**   What is the solution to $5a + 11 + 3a - 7 = {}^-4$?

**A**   $a = \dfrac{^-11}{4}$

**B**   $a = \dfrac{^-7}{4}$

**C**   $a = {}^-1$

**D**   $a = 0$

**46** The table shows some elements of a function.

| $n$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **?** | $\frac{3}{2}$ | $\frac{4}{2}$ | $\frac{5}{2}$ | $\frac{6}{2}$ |

What is the missing rule in this table?

**F** $2n$

**G** $\dfrac{n + 2}{2}$

**H** $\dfrac{2n + 1}{2}$

**J** $3n$

**47** $3^4 = 81$

$3^3 = 27$

$3^2 = 9$

$3^1 = 3$

$3^0 = 1$

$3^{-1} = \dfrac{1}{3}$

$3^{-2} = \dfrac{1}{9}$

What is the value of $3^{-4}$?

**A** $\dfrac{1}{6}$

**B** $\dfrac{1}{24}$

**C** $\dfrac{1}{27}$

**D** $\dfrac{1}{81}$

**48** If $\dfrac{3}{4}(x - 4) = 9$, what is the value of $x$?

**F** 8

**G** 12

**H** 16

**J** $17\dfrac{1}{3}$

**49** A rock that weighed 1.2 pounds on the moon weighed 7.06 pounds on Earth. About how much would an astronaut who weighs 174 pounds on Earth weigh on the moon?

**A** 14.5 lbs

**B** 24.65 lbs

**C** 29.58 lbs

**D** 1,023.53 lbs

**50** Roxanne's car used 4.8 gallons of gasoline to drive 124 miles. If Roxanne has 180 more miles to go, which is *closest* to the additional number of gallons of gasoline the car will use to complete the trip?

**F** 2.5

**G** 7.0

**H** 7.3

**J** 14.1

**51** When any term in this sequence is divided by the previous term, the result is always the same.

3, ⁻6, 12, ⁻24, . . .

What is the 7th term of this sequence?

A  ⁻192
B  ⁻96
C  96
D  192

**52** When 10 is added to the product of 5 and a number, the result is 50. What is the number?

F  5
G  8
H  10
J  12

**53** What value of $x$ satisfies the following?

$$4x + 12 = 100$$

A  13
B  22
C  28
D  37

**54** Which of the following is *not* true?

F  $3x - 8$ is an expression with one variable.

G  $6x + 2y - 7$ is an expression with 3 terms.

H  In the expression, $4x + 6y$, the coefficient of $x$ is 4.

J  $5x + 4 = 39$ is an expression.

**55** What is the solution to $\frac{1}{2}x + 3 = 7$?

A  2
B  4
C  5
D  8

**56** What is the solution to $10x + 13 = 17$?

F  $x = 0.3$
G  $x = 0.4$
H  $x = 3.0$
J  $x = 4.0$

**57** The table shows some elements of a function.

| n | ? |
|---|---|
| 1 | 1 |
| 2 | 5 |
| 3 | 9 |
| 4 | 13 |

What is the missing rule in this table?

A $2n - 1$

B $2n + 1$

C $3n$

D $4n - 3$

**58** Eric is twice as old as his brother Lucas. If 4 is subtracted from Eric's age and 4 is added to Lucas's age, their ages will be equal. What are the boys' ages now?
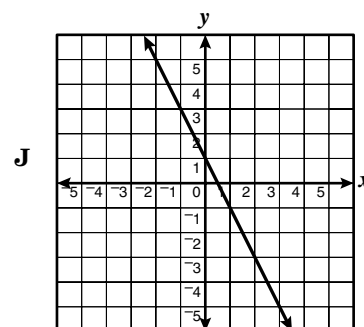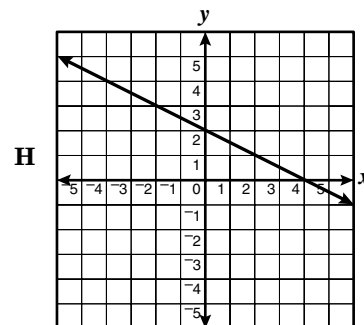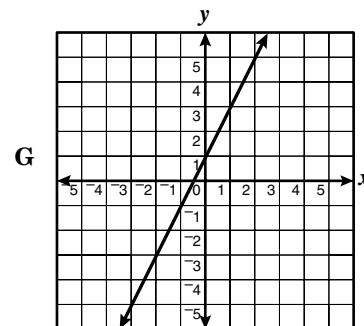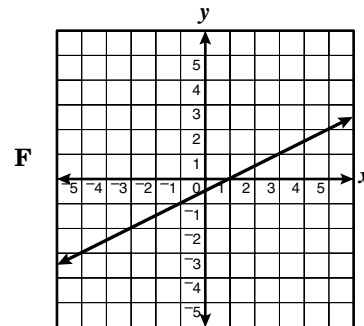
F 12 and 6

G 14 and 7

H 16 and 8

J 18 and 9

**59** Which means "6 less than 5 times a number is 4 more than 3 times that number"?

A $5n - 6 = 3n + 4$

B $5(n - 6) = 3(n + 4)$

C $6 - 5n = 4 + 3n$

D $5(3n + 4) = 6$

**60**

| x | y |
|---|---|
| 2 | 5 |
| 0 | 1 |
| ⁻2 | ⁻3 |

Which graph shows a line that contains the points in the table of ordered pairs?

F


G


H


J

STOP

# Answer Key

| Test Sequence | Correct Answer | Reporting Category | Reporting Category Description |
|---|---|---|---|
| 1 | B | 005 | Number and Number Sense |
| 2 | G | 005 | Number and Number Sense |
| 3 | D | 005 | Number and Number Sense |
| 4 | J | 005 | Number and Number Sense |
| 5 | B | 005 | Number and Number Sense |
| 6 | J | 005 | Number and Number Sense |
| 7 | A | 005 | Number and Number Sense |
| 8 | J | 005 | Number and Number Sense |
| 9 | C | 006 | Computation and Estimation |
| 10 | G | 006 | Computation and Estimation |
| 11 | B | 006 | Computation and Estimation |
| 12 | F | 006 | Computation and Estimation |
| 13 | B | 006 | Computation and Estimation |
| 14 | G | 006 | Computation and Estimation |
| 15 | B | 006 | Computation and Estimation |
| 16 | H | 007 | Measurement and Geometry |
| 17 | B | 007 | Measurement and Geometry |
| 18 | G | 007 | Measurement and Geometry |
| 19 | D | 007 | Measurement and Geometry |
| 20 | H | 007 | Measurement and Geometry |
| 21 | C | 007 | Measurement and Geometry |
| 22 | G | 007 | Measurement and Geometry |
| 23 | D | 007 | Measurement and Geometry |
| 24 | H | 007 | Measurement and Geometry |
| 25 | C | 007 | Measurement and Geometry |
| 26 | G | 007 | Measurement and Geometry |
| 27 | C | 007 | Measurement and Geometry |
| 28 | G | 007 | Measurement and Geometry |
| 29 | B | 007 | Measurement and Geometry |
| 30 | G | 007 | Measurement and Geometry |
| 31 | C | 008 | Probability and Statistics |
| 32 | H | 008 | Probability and Statistics |
| 33 | B | 008 | Probability and Statistics |
| 34 | H | 008 | Probability and Statistics |
| 35 | C | 008 | Probability and Statistics |
| 36 | J | 008 | Probability and Statistics |
| 37 | C | 008 | Probability and Statistics |
| 38 | H | 008 | Probability and Statistics |
| 39 | C | 008 | Probability and Statistics |
| 40 | J | 008 | Probability and Statistics |
| 41 | D | 008 | Probability and Statistics |
| 42 | G | 008 | Probability and Statistics |

| Test Sequence | Correct Answer | Reporting Category | Reporting Category Description |
|:---:|:---:|:---:|:---:|
| 43 | C | 009 | Patterns, Functions, and Algebra |
| 44 | H | 009 | Patterns, Functions, and Algebra |
| 45 | C | 009 | Patterns, Functions, and Algebra |
| 46 | G | 009 | Patterns, Functions, and Algebra |
| 47 | D | 009 | Patterns, Functions, and Algebra |
| 48 | H | 009 | Patterns, Functions, and Algebra |
| 49 | C | 009 | Patterns, Functions, and Algebra |
| 50 | G | 009 | Patterns, Functions, and Algebra |
| 51 | D | 009 | Patterns, Functions, and Algebra |
| 52 | G | 009 | Patterns, Functions, and Algebra |
| 53 | B | 009 | Patterns, Functions, and Algebra |
| 54 | J | 009 | Patterns, Functions, and Algebra |
| 55 | D | 009 | Patterns, Functions, and Algebra |
| 56 | G | 009 | Patterns, Functions, and Algebra |
| 57 | D | 009 | Patterns, Functions, and Algebra |
| 58 | H | 009 | Patterns, Functions, and Algebra |
| 59 | A | 009 | Patterns, Functions, and Algebra |
| 60 | G | 009 | Patterns, Functions, and Algebra |