STUDENT NAME _____

# TAKS-M

Texas Assessment of Knowledge and Skills–Modified

## GRADE 10
## MATHEMATICS

## Administered April 2009

# MATHEMATICS

TAKS-M
Texas Assessment of Knowledge and Skills–Modified

# Mathematics Chart

## LENGTH

| Metric | Customary |
|---|---|
| 1 kilometer = 1000 meters | 1 mile = 1760 yards |
| 1 meter = 100 centimeters | 1 mile = 5280 feet |
| 1 centimeter = 10 millimeters | 1 yard = 3 feet |
| | 1 foot = 12 inches |

## CAPACITY AND VOLUME

| Metric | Customary |
|---|---|
| 1 liter = 1000 milliliters | 1 gallon = 4 quarts |
| | 1 gallon = 128 fluid ounces |
| | 1 quart = 2 pints |
| | 1 pint = 2 cups |
| | 1 cup = 8 fluid ounces |

## MASS AND WEIGHT

| Metric | Customary |
|---|---|
| 1 kilogram = 1000 grams | 1 ton = 2000 pounds |
| 1 gram = 1000 milligrams | 1 pound = 16 ounces |

## TIME

1 year = 365 days

1 year = 12 months

1 year = 52 weeks

1 week = 7 days

1 day = 24 hours

1 hour = 60 minutes

1 minute = 60 seconds

Metric and customary rulers can be found on the separate Mathematics Chart.



**Continued on the next page**

# Mathematics Chart

| | | |
|---|---|---|
| **Perimeter** | rectangle | $P = 2l + 2w$ or $P = 2(l + w)$ |
| **Circumference** | circle | $C = 2\pi r$ or $C = \pi d$ |
| **Area** | rectangle | $A = lw$ or $A = bh$ |
| | triangle | $A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$ |
| | trapezoid | $A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$ |
| | regular polygon | $A = \frac{1}{2}aP$ |
| | circle | $A = \pi r^2$ |
| ***P*** represents the Perimeter of the Base of a three-dimensional figure. | | |
| ***B*** represents the Area of the Base of a three-dimensional figure. | | |
| **Surface Area** | cube (total) | $S = 6s^2$ |
| | prism (lateral) | $S = Ph$ |
| | prism (total) | $S = Ph + 2B$ |
| | pyramid (lateral) | $S = \frac{1}{2}Pl$ |
| | pyramid (total) | $S = \frac{1}{2}Pl + B$ |
| | cylinder (lateral) | $S = 2\pi rh$ |
| | cylinder (total) | $S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$ |
| | cone (lateral) | $S = \pi rl$ |
| | cone (total) | $S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$ |
| | sphere | $S = 4\pi r^2$ |
| **Volume** | prism or cylinder | $V = Bh$ |
| | pyramid or cone | $V = \frac{1}{3}Bh$ |
| | sphere | $V = \frac{4}{3}\pi r^3$ |
| **Special Right Triangles** | 30°, 60°, 90° | $x,\ x\sqrt{3},\ 2x$ |
| | 45°, 45°, 90° | $x,\ x,\ x\sqrt{2}$ |
| **Pythagorean Theorem** | | $a^2 + b^2 = c^2$ |
| **Distance Formula** | | $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ |
| **Slope of a Line** | | $m = \frac{y_2 - y_1}{x_2 - x_1}$ |
| **Midpoint Formula** | | $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ |
| **Quadratic Formula** | | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ |
| **Slope-Intercept Form of an Equation** | | $y = mx + b$ |
| **Point-Slope Form of an Equation** | | $y - y_1 = m(x - x_1)$ |
| **Standard Form of an Equation** | | $Ax + By = C$ |
| **Simple Interest Formula** | | $I = prt$ |

**DIRECTIONS**

**Read each question. Then fill in the correct answer on your answer document.**

## SAMPLE

According to a paint label, 1 gallon of paint will cover 400 square feet of wall space. How many gallons of paint are needed to cover 2800 square feet of wall space?

**A** 28 gal

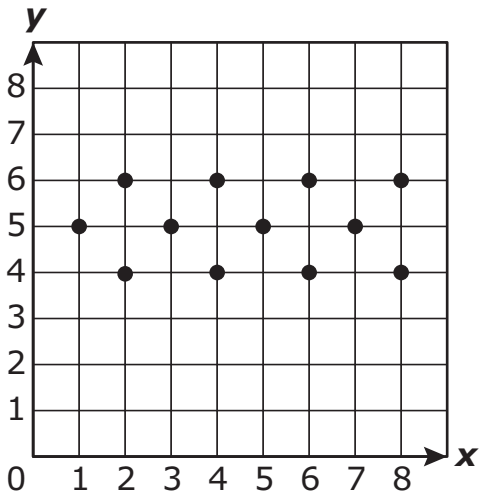
**B** 7 gal

**C** 14 gal

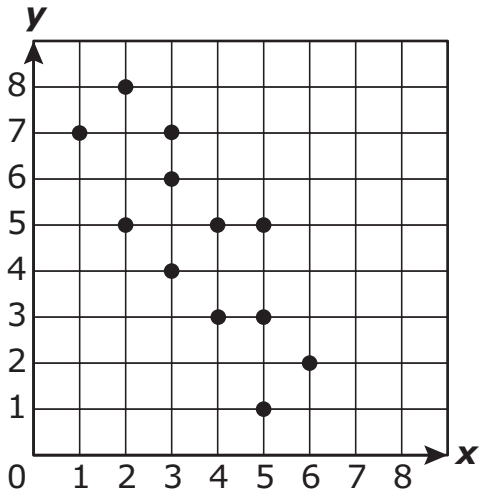


**1** Look at the scatterplots below. Which best represents a negative trend?

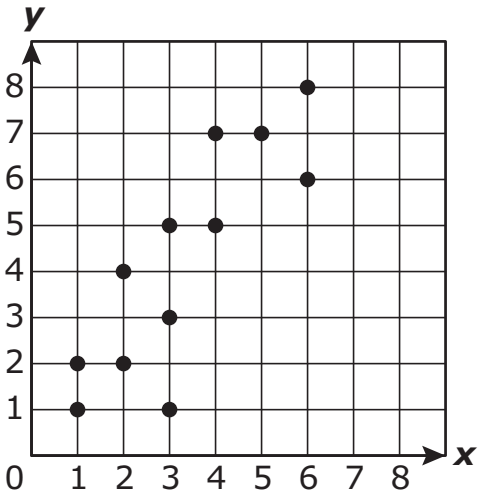
**A**




**B**



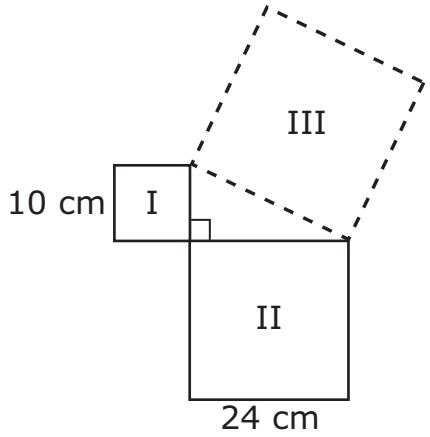

**C**






GO ON

**2** Look at the drawing below. It shows 3 squares that intersect to form a right triangle.




| Pythagorean Theorem: $a^2 + b^2 = c^2$ |
| --- |
| $A = s^2$<br>Area of a square = side · side |

What is the area of square III?

**F** ☐ Area = 120 square centimeters

**G** ☐ Area = 1156 square centimeters

**H** ☐ Area = 676 square centimeters



GO ON

**3** Look at the table below. It shows values of $x$ and $y$.

| $x$ | $y$ |
|---|---|
| −8 | −18 |
| −4 | −13 |
| 4 | −3 |
| 8 | 2 |

Which equation describes the relationship between $x$ and $y$, as shown in the table?

**A** $y = \frac{5}{4}x - 8$

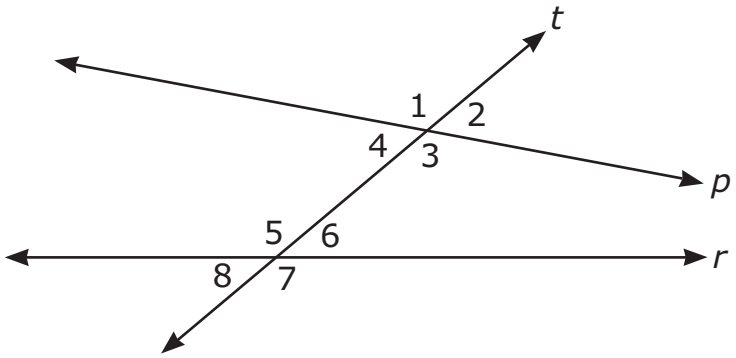
**B** $y = \frac{5}{2}x - 18$

**C** $y = \frac{3}{2}x - 10$



GO ON

**4** Look at lines *p*, *r*, and *t*. They intersect as shown below. Lines *p* and *r* are not parallel.




Based on this information, which of the following statements is always true?

**F** $\angle 2$ and $\angle 8$ are congruent.

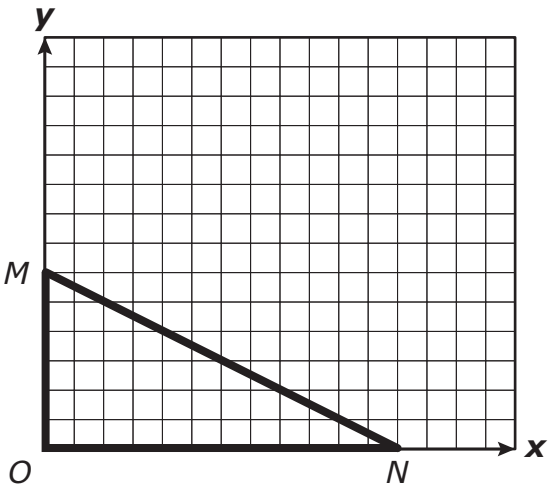
**G** $\angle 5$ and $\angle 7$ are congruent.

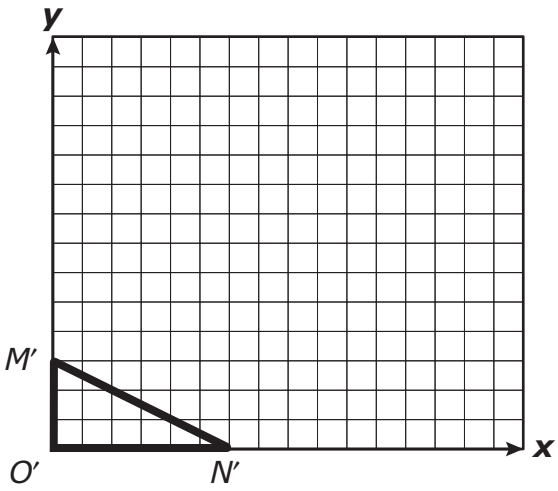
**H** $\angle 4$ and $\angle 8$ are congruent.



GO ON

**5** Which scale factor was used to transform $\Delta MNO$ to $\Delta M'N'O'$?




**A** $\frac{1}{3}$

**B** $\frac{1}{2}$

**C** 3



GO ON

**6** The ratio of the number of females to the total number of students at Olympia High School is 7 to 12. Which best represents the number of females if the total number of students is 576?

**F** 987

**G** 240

**H** 336

**7** What is the solution to $2x - 18 < -36$?

**A** $x < 0$

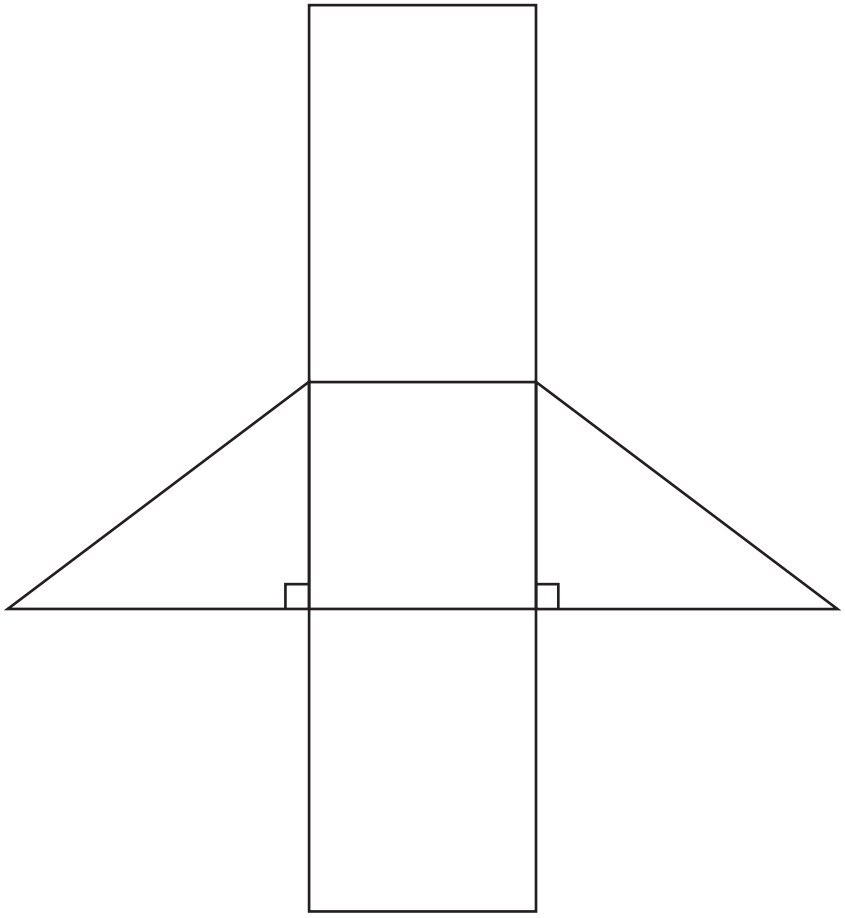
**B** $x < -9$

**C** $x < -27$



GO ON

**8** The net of a right triangular prism is shown below. Use the ruler on the Mathematics Chart to measure the dimensions of the net to the nearest centimeter.



Which is closest to the total surface area of this right triangular prism?

**F** 48 $cm^2$

**G** 36 $cm^2$

**H** 12 $cm^2$



GO ON

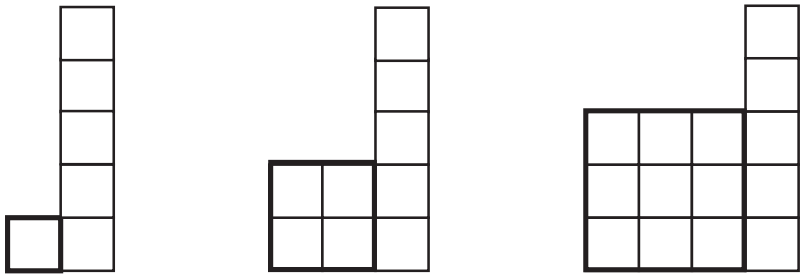
**9** Joan wants to pay for summer camp. Before camp she plans to work 40 hours a week for 6 weeks to earn the $1,305 she needs. What is the lowest hourly rate she can earn to save at least $1,305?

**A** $5.00

**B** $5.44

**C** $5.25

**10** The square tiles below show 3 stages in an increasing pattern.



Stage 1
$n = 1$

Stage 2
$n = 2$

Stage 3
$n = 3$

Which expression can be used to find the number of square tiles in any stage if $n$ = number of a stage?

**F** $7n - 1$

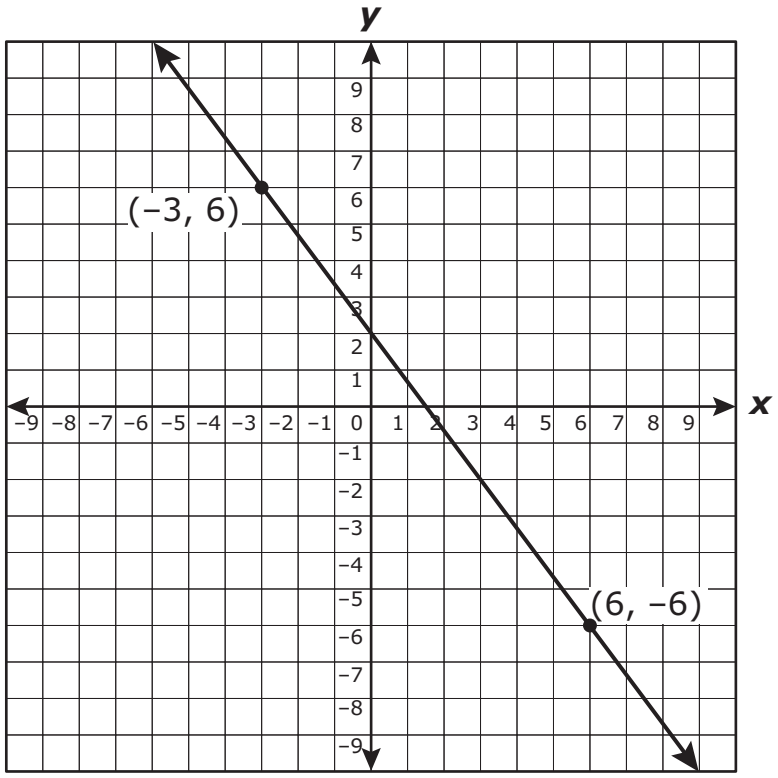
**G** $5n^2 + 1$

**H** $n^2 + 5$



GO ON

**11** Look at the graph below.




Which equation best describes the graph of the line?

**A** $y = -\frac{3}{4}x + \frac{15}{4}$

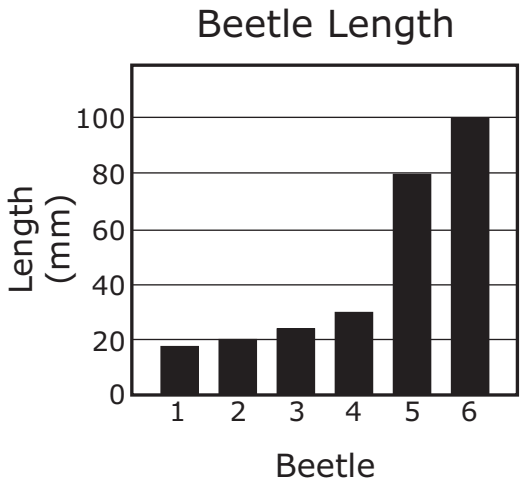
**B** $y = -\frac{4}{3}x + 2$

**C** $y = \frac{3}{4}x + 2$



GO ON

**12** Look at the bar graph below. It shows the length of different beetles in millimeters.




Which measure best describes the difference in length between the shortest and the longest beetle?

**F** Median

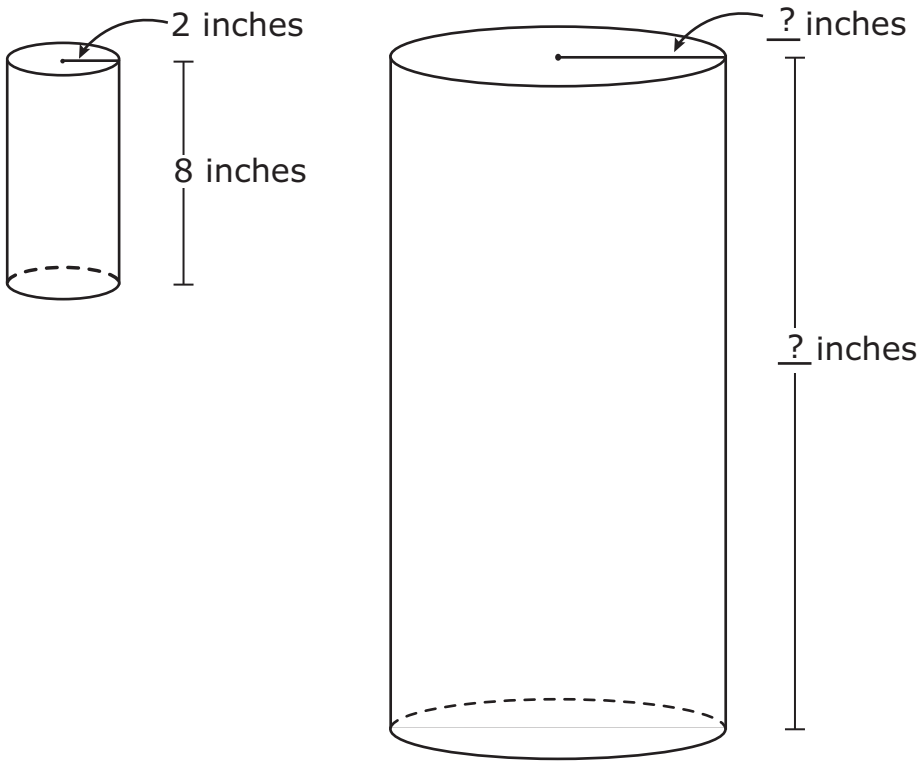
**G** Mode

**H** Range



GO ON

**13** Two cylinders are shown below. The dimensions of one of them are labeled.




$V = \pi r^2 h$

Volume of a cylinder = $\pi$ · radius · radius · height

When each dimension of the smaller cylinder is changed by a scale factor of 3, the larger cylinder is created. Which is closest to the volume of the larger cylinder?

**A** 2,714 in.$^3$

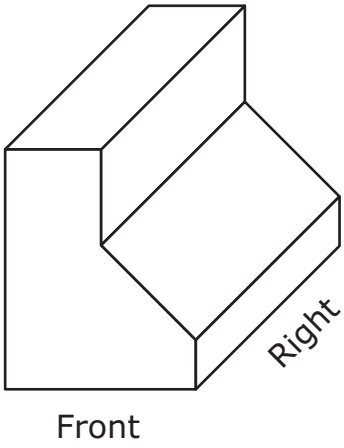
**B** 402 in.$^3$

**C** 10,857 in.$^3$



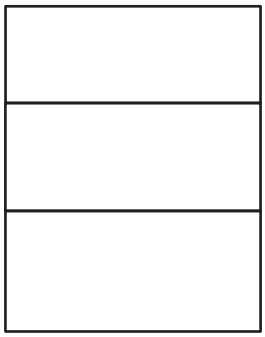
GO ON

**14** Which of the following best represents the right-side view of this 3-dimensional object?

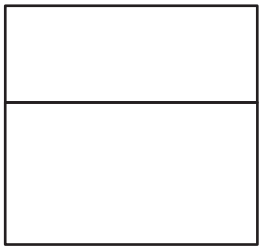



**F**

**G**



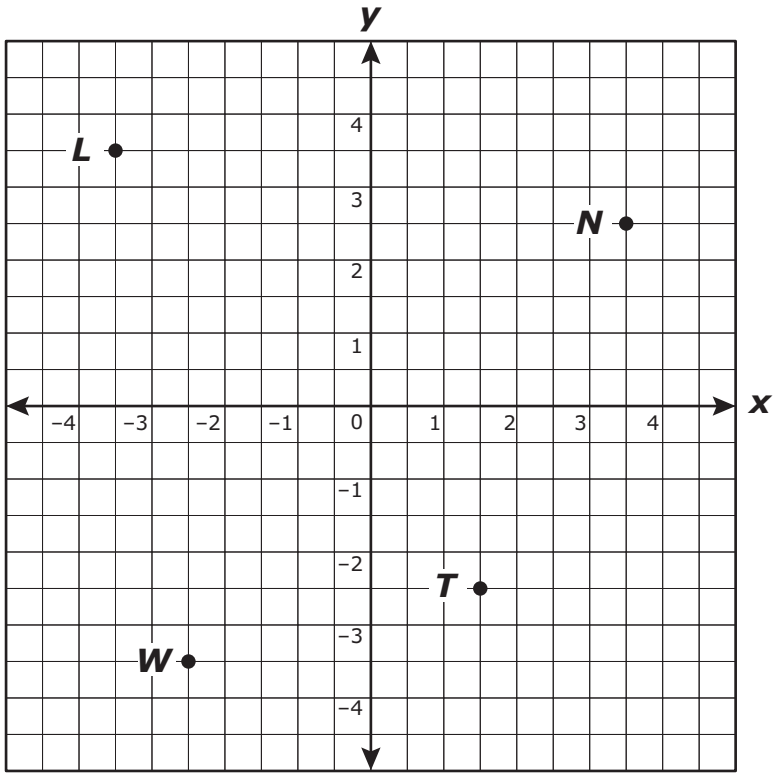
**H**





GO ON

**15** Look at point *W* on the grid below.




Which ordered pair best represents the location of point *W*?

**A** $(-2, -3)$

**B** $(-2\frac{1}{2}, -3)$

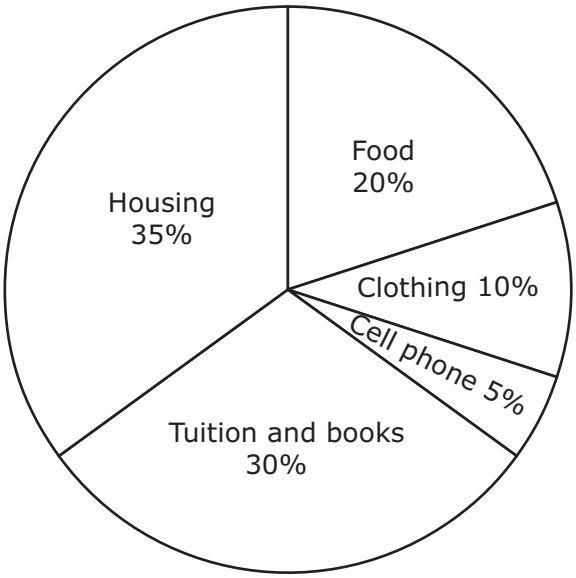
**C** $(-2\frac{1}{2}, -3\frac{1}{2})$



GO ON

**16** The graph below shows Brittany's estimated monthly college expenses.

Brittany's Estimated Monthly Expenses




Circle = 360°

Which table best represents the central angle of each sector of the graph?

**F**

Brittany's Estimated Monthly Expenses

| Expense | Central Angle |
|---|---|
| Housing | 42° |
| Food | 24° |
| Clothing | 12° |
| Cell phone | 6° |
| Tuition and books | 36° |

**H**

Brittany's Estimated Monthly Expenses

| Expense | Central Angle |
|---|---|
| Housing | 126° |
| Food | 18° |
| Clothing | 36° |
| Cell phone | 72° |
| Tuition and books | 108° |

**G**

Brittany's Estimated Monthly Expenses

| Expense | Central Angle |
|---|---|
| Housing | 126° |
| Food | 72° |
| Clothing | 36° |
| Cell phone | 18° |
| Tuition and books | 108° |



GO ON

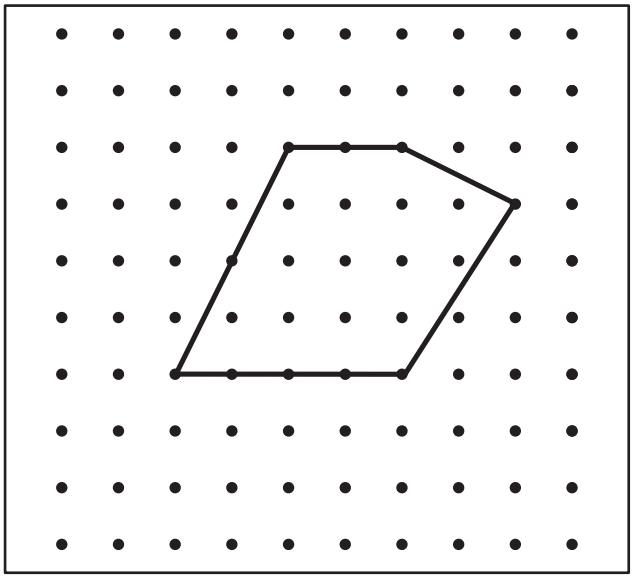
**17** Mrs. Singh asked her students to find an expression that is equal to $\frac{8x^4y^6}{2x^2y^2}$. Which student response is correct?

**A** $6x^6y^8$

**B** $4x^2y^3$

**C** $4x^2y^4$

**18** The horizontal and the vertical distance between each peg on the geoboard shown below represents 1 unit.



Which is closest to the area of the polygon modeled on the geoboard?

**F** 16 units$^2$

**G** 21 units$^2$

**H** 12 units$^2$



GO ON

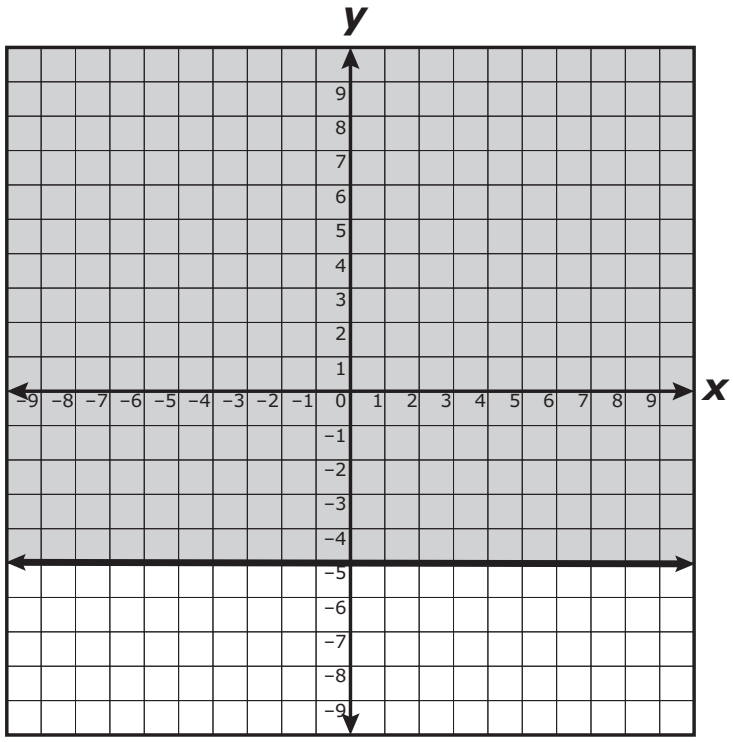
**19** Today is Marietta's birthday. Her age is 10 years less than half her father's age. Which expression can be used to find Marietta's age if $f$ represents her father's age?

**A** $\frac{1}{2}(10 - f)$

**B** $\frac{1}{2}f - 10$

**C** $\frac{1}{2}(f - 10)$

**20** Which inequality best represents the graph shown below?




**F** $y \geq -5$

**G** $y > -5$

**H** $y < -5$



GO ON

**21** If $y$ is directly proportional to $x$ and $y = 24$ when $x = 16$, what is the value of $y$ when $x = 6$?

**A** 9

**B** 4

**C** 10

**22** Nelson chose a 1-year contract for a new cell-phone plan. The plan includes 2 separate fees.

- $39 for the monthly fee
- $0.05 for each minute of phone use

| 1 year = 12 months |
|---|

If $m$ represents the number of minutes used, which equation can be used to determine $t$, the plan's total cost in dollars for 1 year?

**F** $t = 12(39) + 5m$

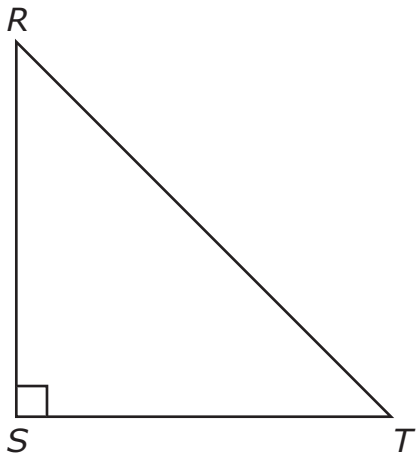
**G** $t = 12(39 + 5)m$

**H** $t = 12(39) + 0.05m$



GO ON

**23** Which of the following statements is true about the right triangle shown below?




**A** $m\angle T = m\angle R$ when $RS = 5$ and $TS = 5$.

**B** $m\angle T > m\angle R$ when $RS = 4$ and $TS = 5$.

**C** $\angle T$ and $\angle R$ are supplementary when $RS = 5$ and $TS = 4$.

**24** An architect made a scale model of a building. The model is similar to the building.

- The actual building is 360 feet wide.
- The actual building is 480 feet long.
- The model is based on a scale where 1 inch represents 8 feet.

What are the width and length of the model?

**F** 15 in. by 20 in.

**G** $11\frac{1}{4}$ in. by 15 in.

**H** 45 in. by 60 in.



GO ON

**25** Which table best represents the function $y = 2x - 6$?

**A**

| *x* | *y* |
|---|---|
| −3 | −12 |
| 1 | 4 |
| 3 | 0 |
| 7 | −8 |

**B**

| *x* | *y* |
|---|---|
| −1 | 4 |
| 3 | 12 |
| 4 | 14 |
| 7 | 20 |

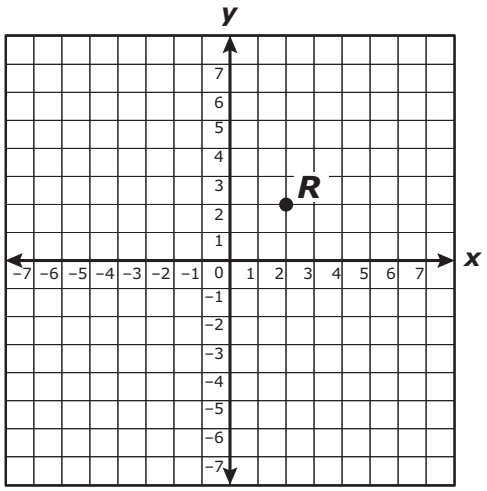
**C**

| *x* | *y* |
|---|---|
| −3 | −12 |
| 2 | −2 |
| 3 | 0 |
| 7 | 8 |



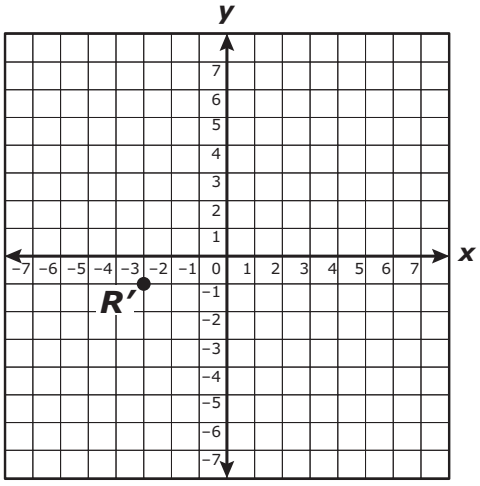
GO ON

**26** Look at point *R* on the grid below.

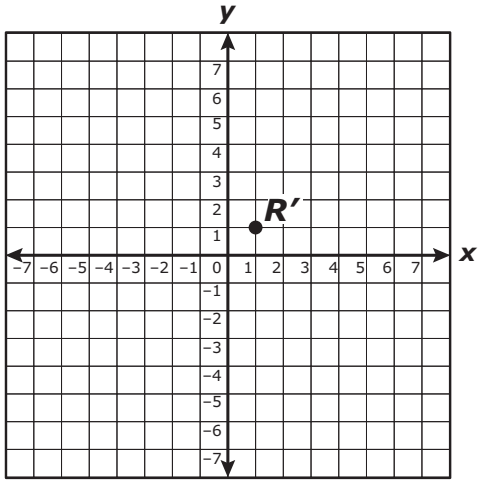



Which is a reflection of point *R* across the *x*-axis followed by the translation $(x + 3, y - 1)$?

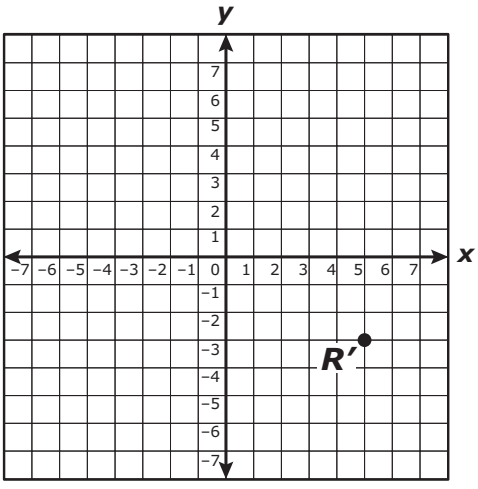
**F**




**H**



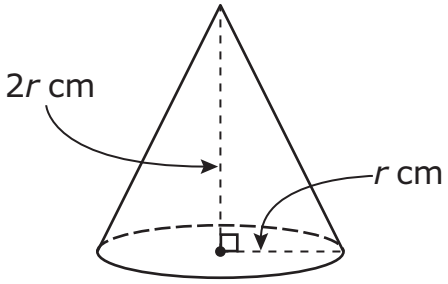

**G**






GO ON

**27** Look at the cone below.




$$V = \frac{1}{3}\pi r^2 h$$

$$\text{Volume of a cone} = \frac{1}{3}\pi \cdot \text{radius} \cdot \text{radius} \cdot \text{height}$$

Which equation best represents $V$, the volume of the cone in terms of $\pi$?

**A** $V = \frac{1}{3}\pi(2r)^2(r)$

**B** $V = \frac{1}{3}\pi r^2(2r)$

**C** $V = \frac{1}{3}\pi(3r)^2$



GO ON

**28** Lorraine was in a race.

- She ran $\frac{3}{4}$ of the total distance.
- She walked the remaining 2.5 kilometers.

Which equation can be used to find $x$, the total length of the race in kilometers?

**F** $x = \frac{1}{4}x + 2.5$

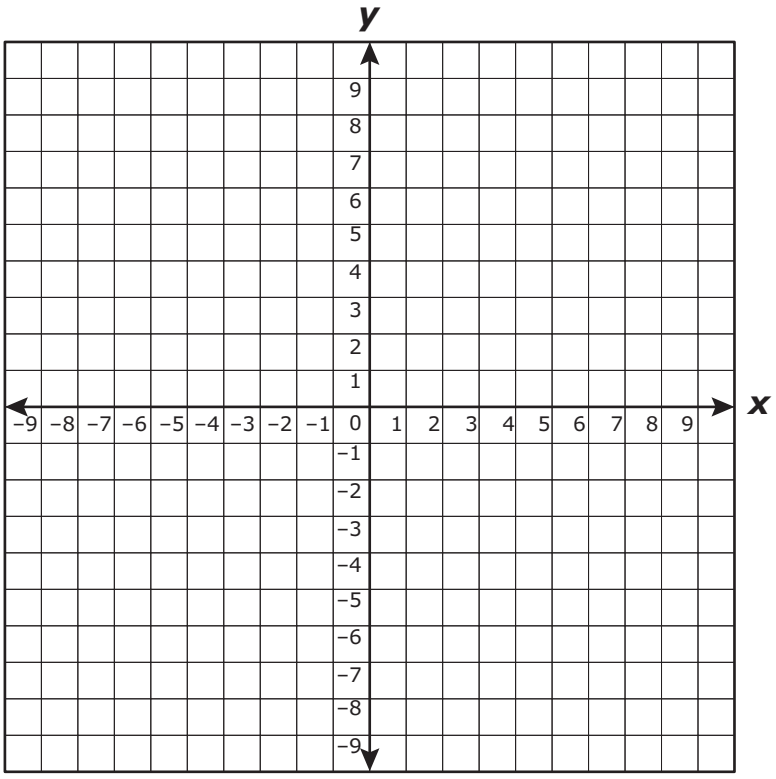
**G** $x = -\frac{1}{4}x + 2.5$

**H** $x = \frac{3}{4}x + 2.5$



GO ON

**29** Which of the following represents the vertex of the graph of the equation $y = x^2 - 4x + 3$?




**A** $(2, -1)$

**B** $(2, 0)$

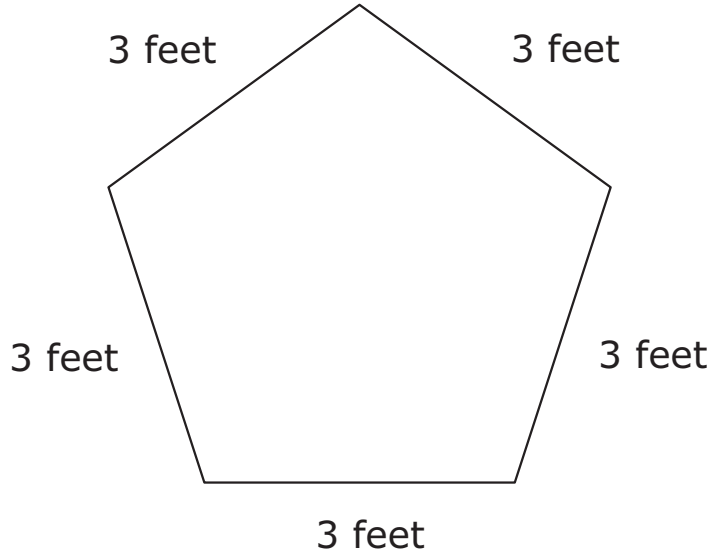
**C** $(3, 0)$



GO ON

**30** A local restaurant was framing a mirror in the shape of a pentagon.

- Each side of the frame measured 3 feet.
- It cost $7.50 per foot, not including tax, to build the frame.




How much did the frame for the restaurant's mirror cost before tax?

**F** $112.50

**G** $37.50

**H** $90.00



GO ON

**31** Look at the table below. It shows the number of bags of different types of potato chips that were purchased during lunchtime.

Bags of Chips Purchased

| Flavor | Number of Bags Purchased |
|---|---|
| Ranch | 39 |
| Cheese | 54 |
| Regular | 78 |
| Sour cream | 102 |

Which conclusion can be best supported by the information in the table?

**A** The range of the number of bags of chips purchased is 24.

**B** The number of bags of sour cream chips purchased was twice the number of bags of cheese chips purchased.

**C** The number of bags of ranch chips purchased was half the number of bags of regular chips purchased.

**32** Mr. Howard has a total budget of $950 for computer programs and calculators.

- He will spend between $25 and $40 for each computer program.
- He will spend between $50 and $75 for each calculator.

Which is a reasonable number of computer programs and calculators that Mr. Howard can purchase?

**F** 15 programs and 10 calculators

**G** 15 programs and 20 calculators

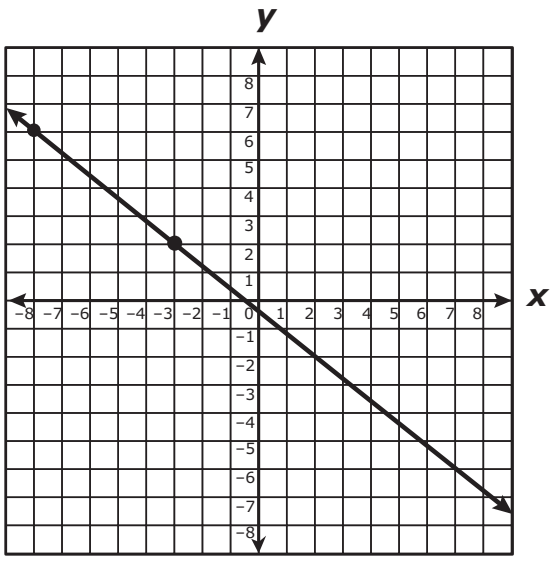
**H** 20 programs and 10 calculators



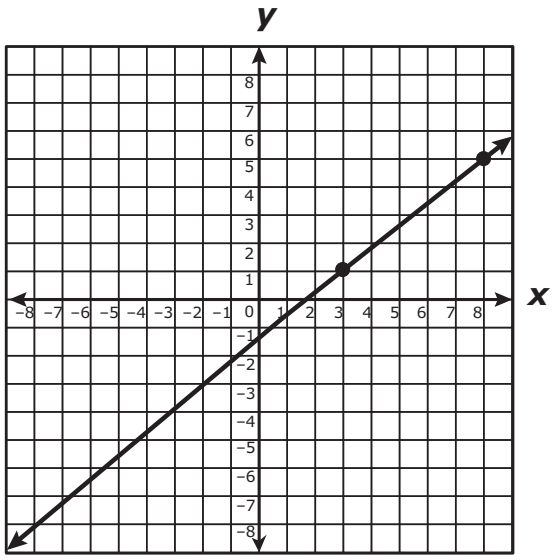
GO ON

**33** Which of the lines graphed below appears to have a slope of $-\frac{4}{5}$?

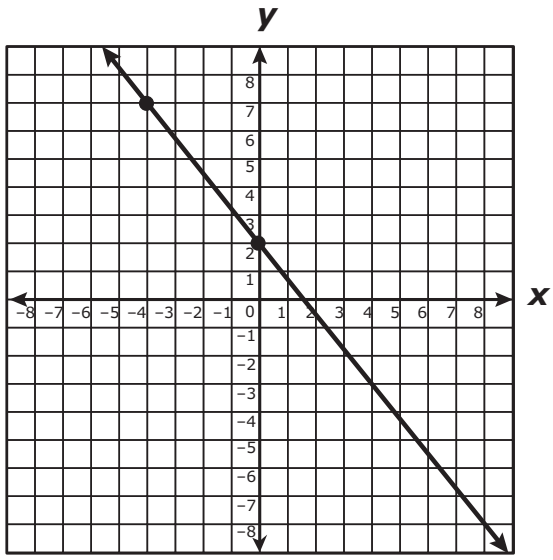
**A**




**B**




**C**






GO ON

**34** Ms. Allen is ordering tiles to cover a wall.

- Each tile is a 4-inch square.
- The tiles cost $2.25 each.
- The wall is 20 feet long.

What additional information does Ms. Allen need to determine how many tiles to order?

**F** The size of the tiles she will use

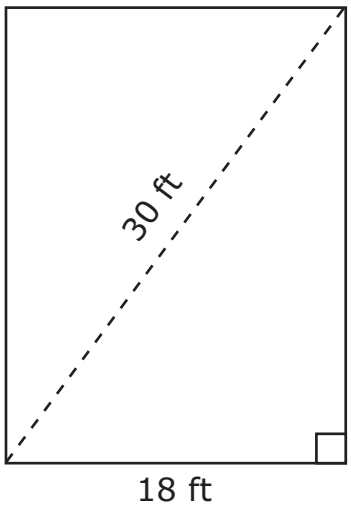
**G** The height of the wall

**H** The color of the tiles



GO ON

**35** Mrs. Martínez has a front yard shaped like a rectangle.




| Pythagorean Theorem: $a^2 + b^2 = c^2$ |
| --- |
| $P = 2l + 2w$<br>Perimeter = 2 · length + 2 · width |

The width of the yard is 18 feet, and the length of the diagonal of the yard is 30 feet. What is the perimeter of the yard?

**A** 432 ft

**B** 84 ft

**C** 42 ft



GO ON

**36** Central High School assigns points for every grade a student earns in a class. The point value assigned for each grade is shown in the table below.

Grade Points

| Course Grade | Points |
|---|---|
| A | 4 |
| B | 3 |
| C | 2 |

Bill had the following grades on his report card.

Bill's Report Card

| Course | Grade |
|---|---|
| English | B |
| Geometry | B |
| Physics | C |
| History | A |

A student's grade-point average can be found by dividing the sum of the student's grade points by the number of courses the student took. Which of the following best describes how Bill's grade-point average should be computed?

**F** (2 times the number of A's, plus 3 times the number of B's, plus 4 times the number of C's) divided by 4

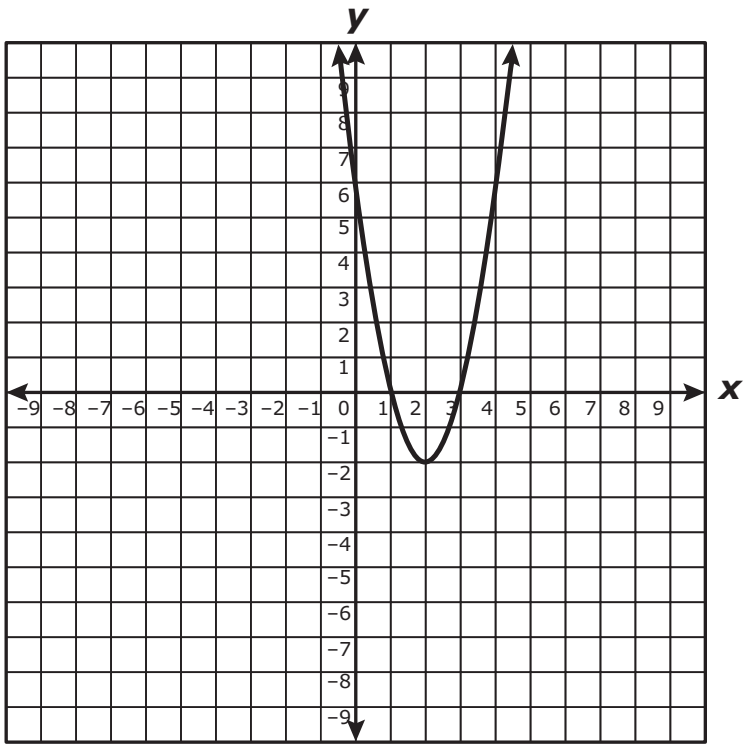
**G** (2 plus 3 plus 4) divided by 4

**H** (4 times the number of A's, plus 3 times the number of B's, plus 2 times the number of C's) divided by 4



GO ON

**37** The graph of a quadratic function is shown on the grid below.




Which best represents the *x*-intercepts of the graph of this function?

**A** (0, 6), (2, −2)

**B** (1, 0), (3, 0)

**C** (2, 0), (3, 0)



GO ON

**38** A soccer team wants to attend a sports camp.

- The camp costs $250 per team.
- The team must also pay $75 for each player.
- The team must buy a $12 T-shirt for each player.

Which equation best represents $t$, the total cost for a team with $n$ players to attend the sports camp?

**F** $t = 250 + 87n$

**G** $t = 262 + 87n$

**H** $t = 250 + 75n$

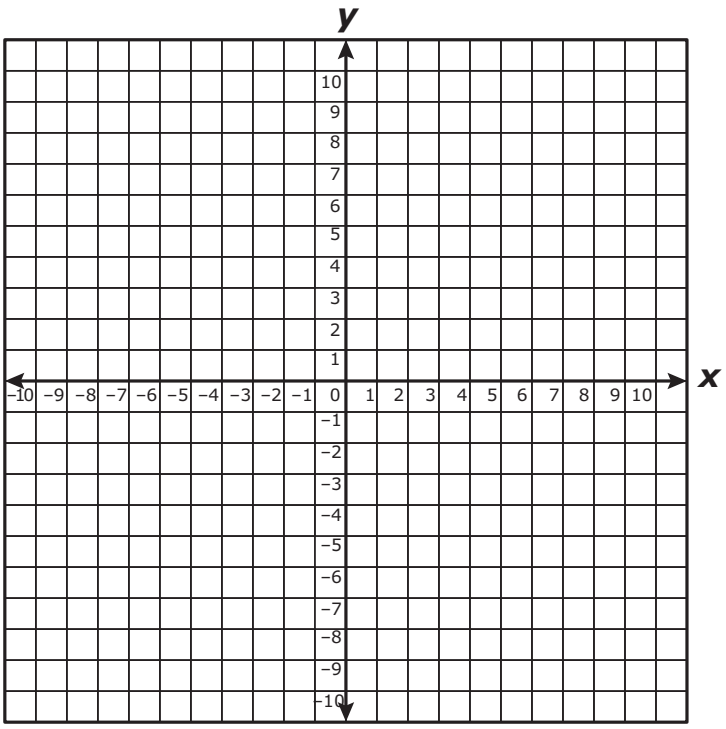


GO ON

**39** What is the solution for the following system of linear equations?

$$y = 2x$$

$$y = -2x + 4$$




**A** (1, 2)

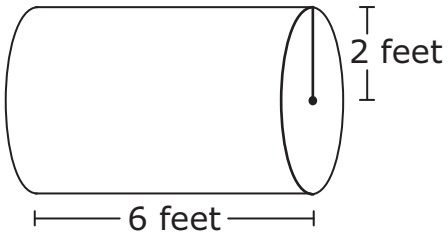
**B** (2, 0)

**C** (0, 4)



GO ON

**40** At a playground children climb in and out of an open concrete cylinder. The cylinder is sketched below.




$S = 2\pi rh$
Lateral surface area of a cylinder = $2 \cdot \pi \cdot$ radius $\cdot$ height

Which value is closest to the lateral surface area of the cylinder?

**F** 13 $ft^2$

**G** 75 $ft^2$

**H** 100 $ft^2$



GO ON

**41** How is the graph of $y = 2x^2$ different from the graph of $y = -3x^2$?

**A** The graph of $y = 2x^2$ opens downward and is wider than the graph of $y = -3x^2$.

**B** The graph of $y = 2x^2$ opens downward and is narrower than the graph of $y = -3x^2$.

**C** The graph of $y = 2x^2$ opens upward and is wider than the graph of $y = -3x^2$.

**42** Which expression is equivalent to $5(-4x^2 + 5x) + 8(3x^2 - 2x - 5)$?

**F** $4x^2 + 9x - 40$

**G** $2x^2 - 13$

**H** $12x^2 + 16x + 3$



GO ON

**43** If the dimensions of a rectangle are enlarged by a scale factor of 4, what will be the effect on the area of the rectangle?

**A** The new area will be 16 times as large as the original area.

**B** The new area will be 2 times as large as the original area.

**C** The new area will be 8 times as large as the original area.

**44** If $k$ is a function of $t$, which statement best describes the functional relationship in the equation $k = t + 9$?

**F** The value of $t$ is dependent on $k$.

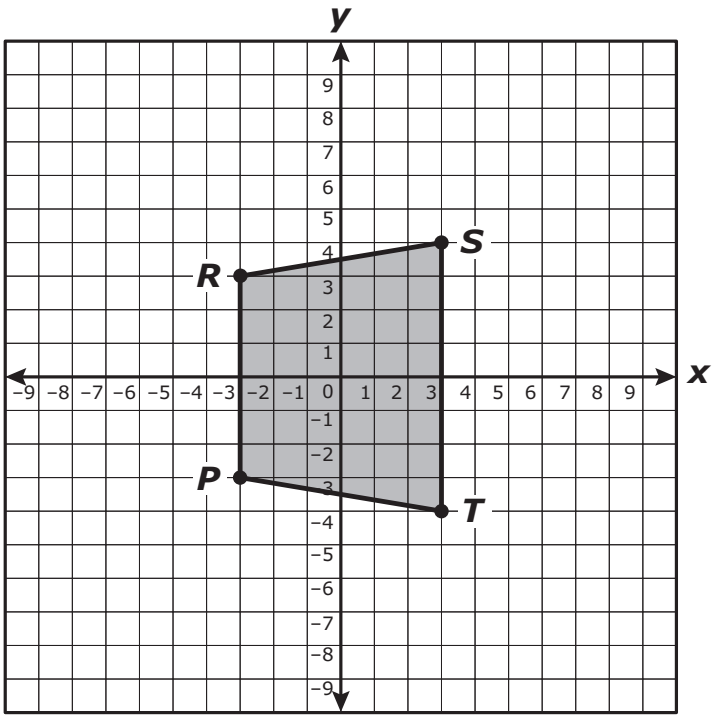
**G** The value of $k$ is dependent on $t$.

**H** The values of $k$ and 9 are dependent on $t$.



GO ON

**45** Look at trapezoid *PRST* graphed on the grid below.




Which of the following segments of trapezoid *PRST* has endpoints (−3, −3) and (3, −4)?

**A** $\overline{ST}$

**B** $\overline{RS}$

**C** $\overline{PT}$

BE SURE ALL OF YOUR ANSWERS ARE RECORDED ON THE ANSWER DOCUMENT.



STOP

TAKS-M GRADE 10
MATHEMATICS
APRIL 2009