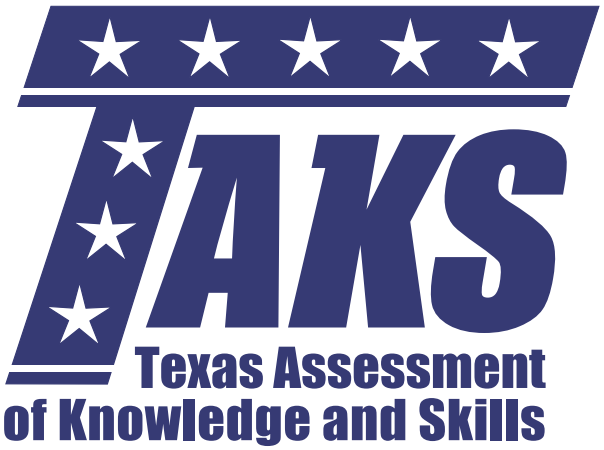
STUDENT NAME _____



GRADE 9
MATHEMATICS

Administered April 2009

MATHEMATICS

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. If a correct answer is not here, mark the letter for "Not here."

SAMPLE A

Find the slope of the line $2y = 8x - 3$.

A $-\frac{3}{2}$

B 4

C 8

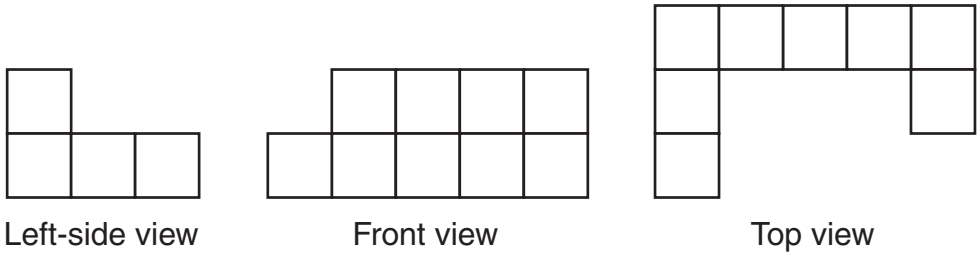
D Not here

SAMPLE B

Janice uses a rectangular box to store her art supplies. The dimensions of the rectangular box are 22.5 inches by 14 inches by 11.5 inches. What is the volume of this box in cubic inches?

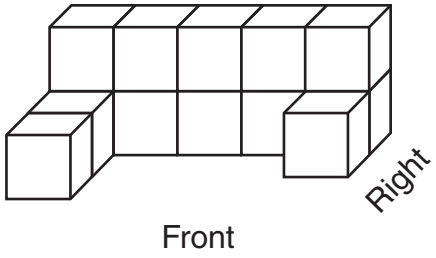
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

1 The drawings below show the left-side, front, and top views of a three-dimensional structure built with identical cubes.

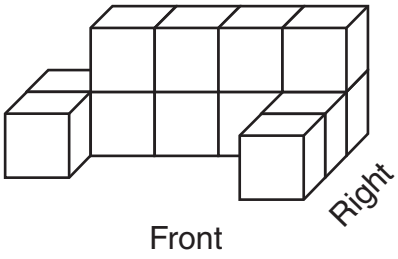


Which of the following 3-dimensional structures is best represented by these views?

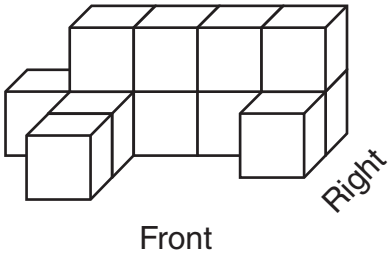
A



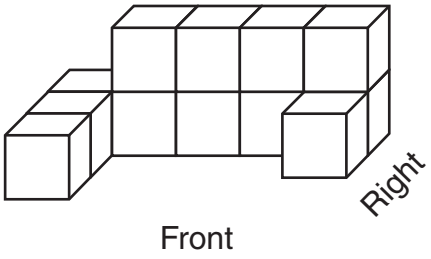
C



B

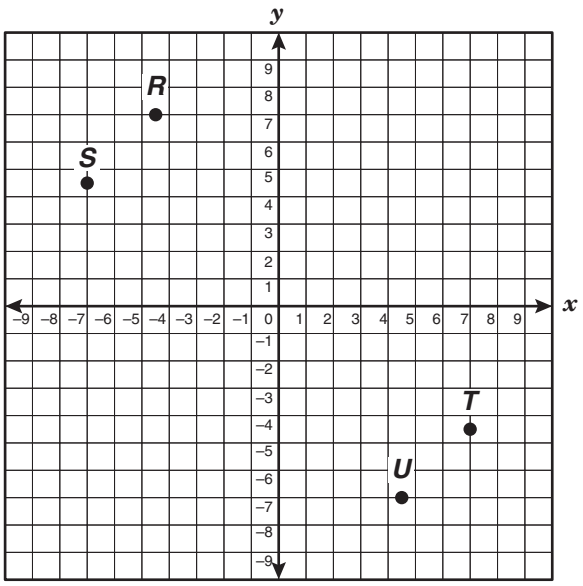


D



GO ON

2 Which point on the grid below best represents $(-4\frac{1}{2}, 7)$?



F Point R

G Point S

H Point T

J Point U

3 Chantelle won 9 of 15 tennis games she played. At this rate, which of the following is the best prediction of the number of tennis games she will win out of her next 12 games?

A 4

B 7

C 11

D 6

4 The original function $y = \frac{2}{5}x + 4$ is graphed on the same grid as the new function $y = \frac{5}{2}x + 4$. Which of the following statements about these graphs is true?

F The graph of the original function is steeper than the graph of the new function.

G The graph of the original function is parallel to the graph of the new function.

H The graphs intersect at (4, 0).

J The graphs intersect at (0, 4).

5 Millie entered her dog in a dog show. Her dog got a score of 64. Which measure of data can Millie use to determine whether her dog's score was in the top half of all scores at the show?

A Median

B Mode

C Mean

D Range

6 Dante has 5 times as many marbles as Kenny. Juan has $\frac{1}{3}$ as many marbles as Dante. If Kenny has 30 marbles, how many marbles does Juan have?

F 6

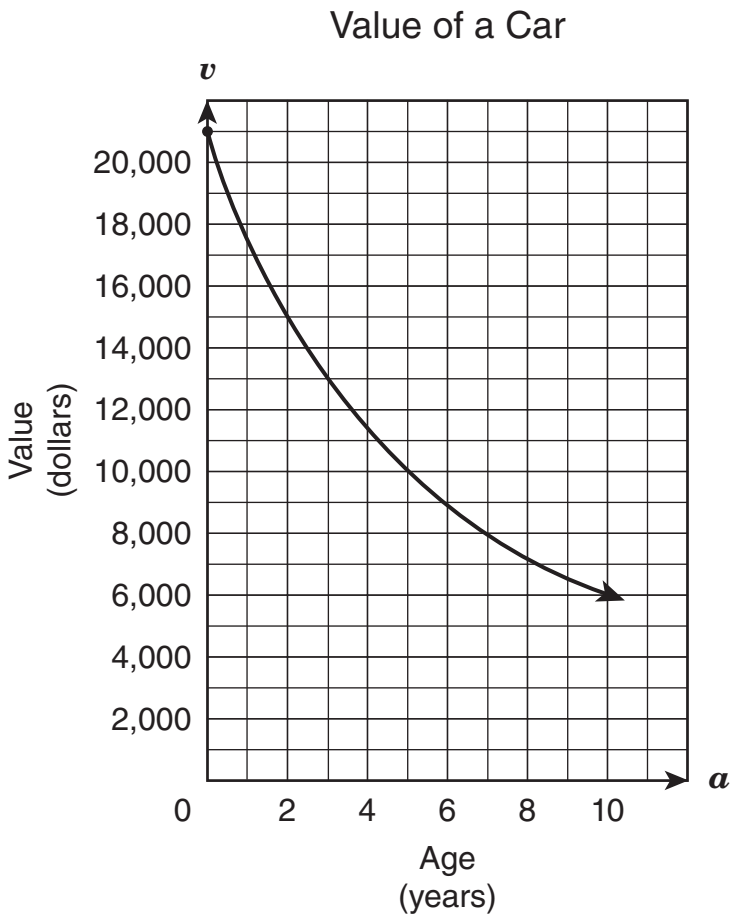
G 50

H 2

J 18

GO ON

7 The graph below shows the relationship between the value of a car in dollars and the age of the car in years.



According to the graph, which of the following statements appears to be true?

A The value of the car decreased by $1,000 per year.

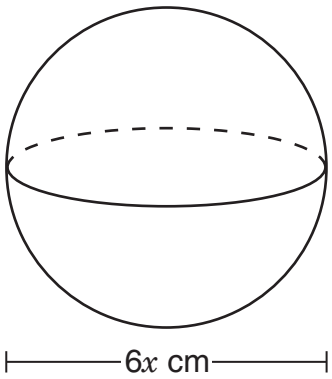
B The value of the car decreased by $2,000 per year.

C The value of the car decreased more from Year 9 to Year 10 than in any other year.

D The value of the car decreased more from Year 0 to Year 1 than in any other year.

GO ON

8 A sphere with a diameter of $6x$ centimeters is shown below.



Which of the following expressions best represents the volume of this sphere in cubic centimeters in terms of π?

F $\frac{4}{3}\pi(3x)^3$

G $\frac{4}{3}\pi(6x)^3$

H $4\pi(3x)^2$

J $4\pi(6x)^2$

9 Josh earns money by washing cars in his neighborhood. He spent \$215 on supplies and charges \$15 for each car washed. Josh's profit, p, can be represented by the function $p = 15n - 215$, where n represents the number of cars that Josh washes. What is the minimum number of cars Josh must wash to make a profit?

A 14

B 29

C 15

D Not here

10 Which expression is equivalent to $-7(x - 2) + 5(3 - x) - 4x$?

F $-16x + 1$

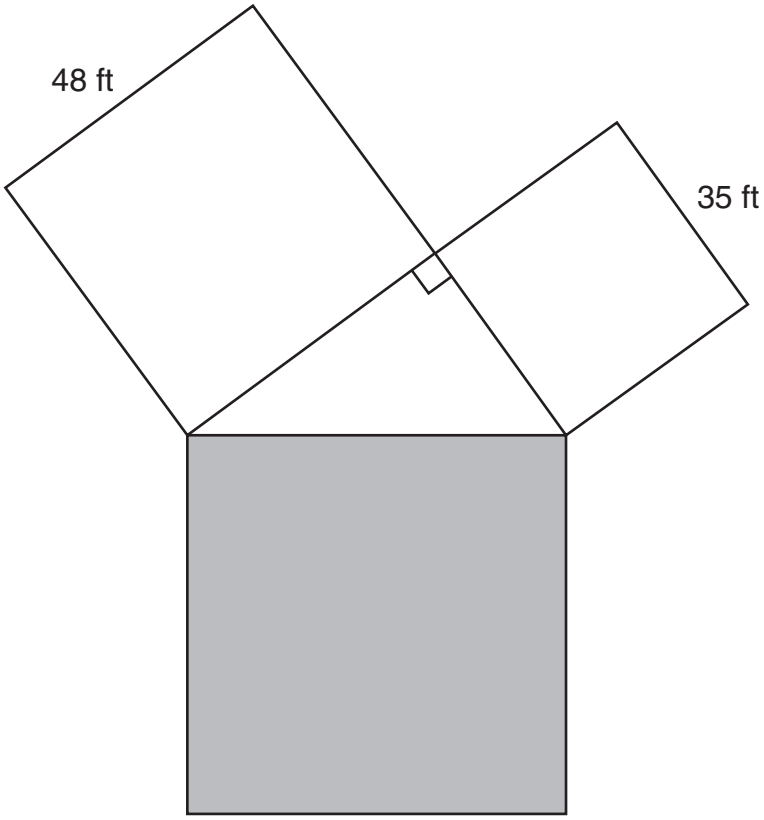
G $-16x + 29$

H $-2x + 1$

J $-12x + 13$

GO ON

11 The drawing below shows three squares joined at their vertices to form a right triangle.



What is the area of the shaded square?

A 3529 ft^2

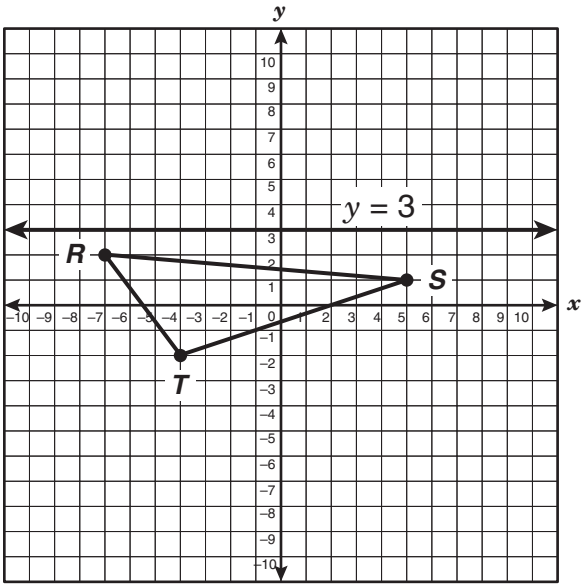
B 1079 ft^2

C 6889 ft^2

D 169 ft^2

GO ON

12 The graph of ΔRST is shown below.



If ΔRST is reflected across the line $y = 3$, which of the following ordered pairs best represents point T'?

F $(-4, 8)$

G $(-4, 2)$

H $(10, -2)$

J $(4, -2)$

13 Kara claims that the expression $x^2 + 1$ results in an even number for all integer values of x. Which value of x shows that Kara's claim is incorrect?

A $x = 5$

B $x = -3$

C $x = 0$

D $x = -1$

14 A salesperson's commission, c, is 6% of her total sales, s. Which function best represents the salesperson's commission?

F $c = 0.06s$

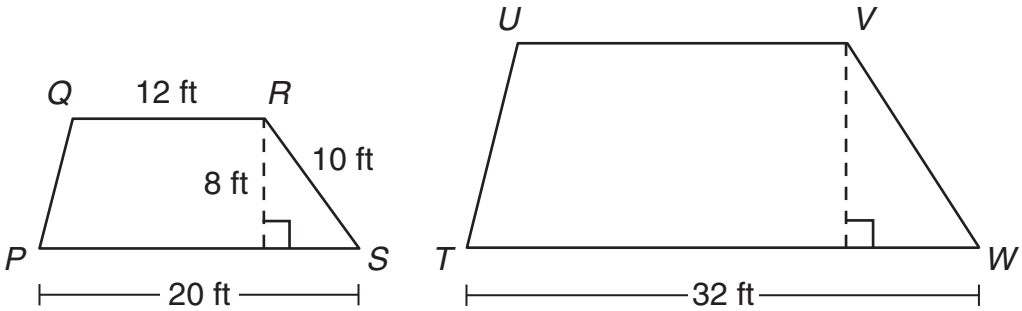
G $c = s + 0.06$

H $c = s + 0.06s$

J $c = \left(\frac{6}{s}\right)(100)$

GO ON

15 Trapezoid *PQRS* is similar to trapezoid *TUVW*.



What is the height of the larger trapezoid?

A $19\frac{1}{5}$ ft

B 16 ft

C $12\frac{4}{5}$ ft

D 20 ft

GO ON

16 How does the graph of $y = 3x^2 - 5$ compare with the graph of $y = 3x^2 + 8$?

F The graph of $y = 3x^2 - 5$ is 3 units above the graph of $y = 3x^2 + 8$.

G The graph of $y = 3x^2 - 5$ is 13 units below the graph of $y = 3x^2 + 8$.

H The graph of $y = 3x^2 - 5$ is 3 units to the right of the graph of $y = 3x^2 + 8$.

J The graph of $y = 3x^2 - 5$ is 13 units to the left of the graph of $y = 3x^2 + 8$.

17 If today is Tuesday, what day of the week will it be 100 days from today?

A Tuesday

B Wednesday

C Thursday

D Friday

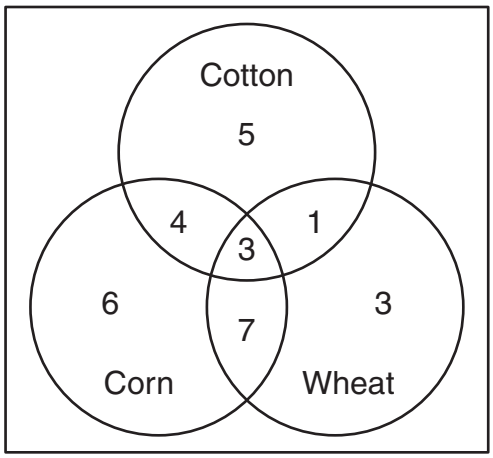
GO ON

18 A county commissioner surveyed the farmers in her county about the crops they grow. The results of the survey are shown below.

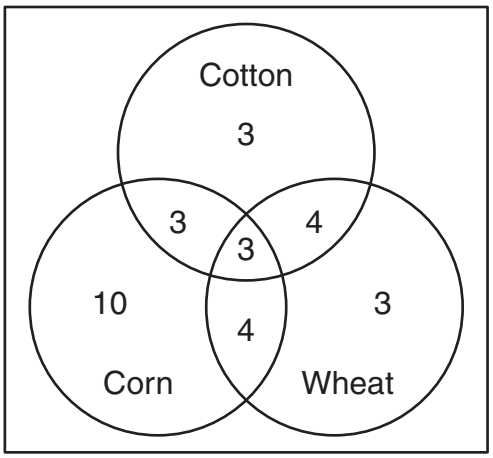
- A total of 13 farmers grow cotton.
- A total of 14 farmers grow wheat.
- A total of 20 farmers grow corn.

Some farmers in the list above grow more than 1 crop. Exactly 3 of the farmers in the list above said that they grow all 3 crops. Which of the following Venn diagrams could not represent this situation?

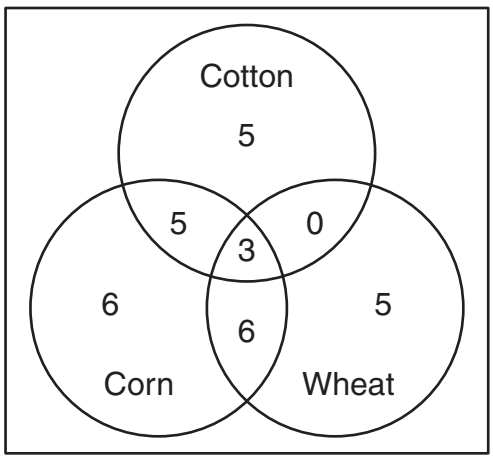
F



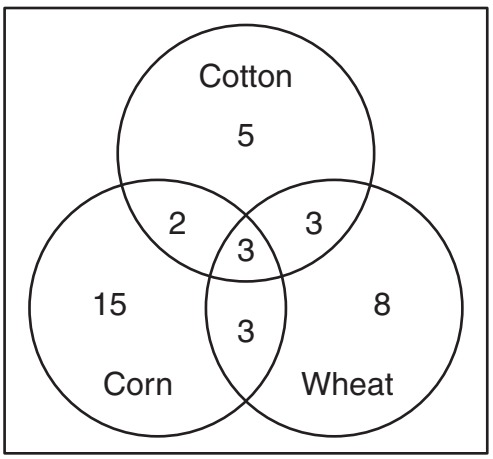
H



G



J

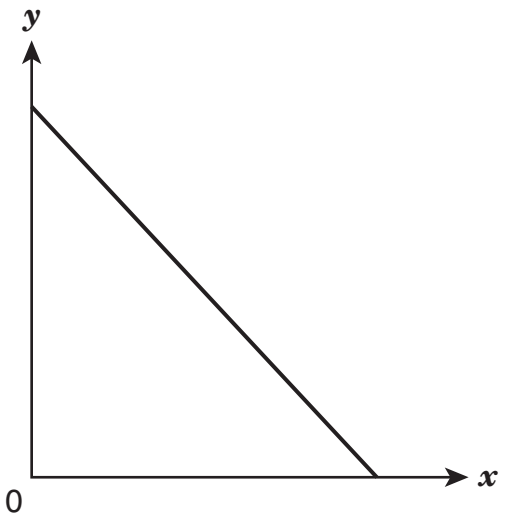


19 In the equation $6.5x + 1.4y = 59$, what is the value of x when $y = 5$?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

GO ON

20 The function graphed below shows a relationship between x and y.



Which of the following relationships can best be represented by this graph?

F The total number of gallons of gas left in a gas tank, y, based on x, the total number of miles driven

G The total cost of a shipment of jeans, y, based on x, the number of jeans in the shipment

H The total amount of hourly earnings, y, based on x, the total number of hours worked

J The total number of pounds of flour used, y, based on x, the total number of loaves of bread baked

21 If the diameter of a circle is dilated by a scale factor of 0.6, what will be the effect on the circle's circumference?

A The circumference will be 0.3 times as large.

B The circumference will be 0.36 times as large.

C The circumference will be 1.88 times as large.

D The circumference will be 0.6 times as large.

22 If y varies directly with x, and y is 84 when x is 16, which of the following represents this situation?

F $y = 100x$

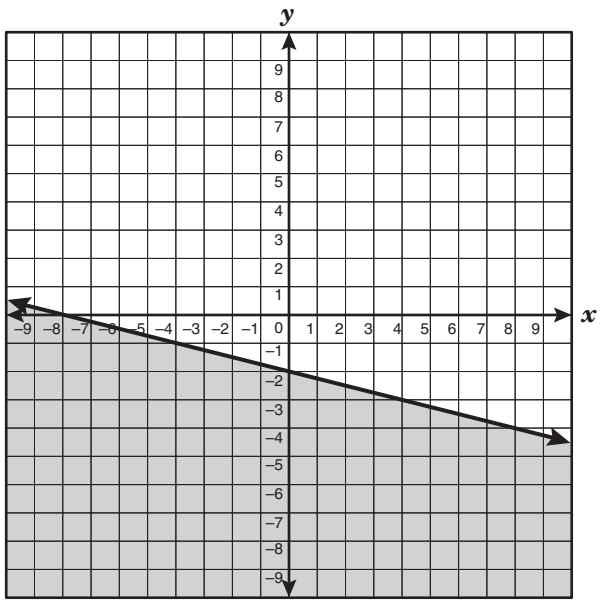
G $y = \frac{21}{4}x$

H $y = 68x$

J $y = \frac{4}{21}x$

GO ON

23 Which of the following inequalities best describes the graph shown below?



A $y \leq -\frac{1}{4}x - 8$

B $y \leq -\frac{1}{4}x - 2$

C $y \geq -\frac{1}{4}x - 8$

D $y \geq -\frac{1}{4}x - 2$

24 The manager of a day-care center wants to serve $\frac{1}{2}$ pint of milk to each of the 48 children at the center each day. She can buy the milk in $\frac{1}{2}$-pint cartons for \$0.35 each, or she can buy 1-gallon containers of milk for \$3.26 each. Which of these best represents how much the manager will save on milk each day if she buys the milk in 1-gallon containers?

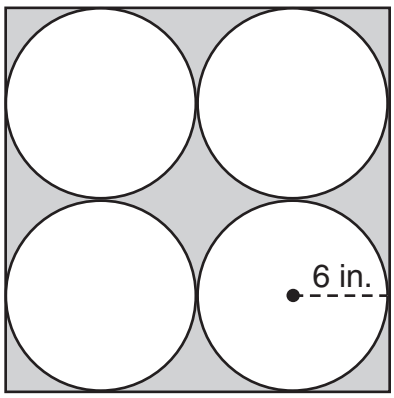
F \$9.78

G \$2.76

H \$7.02

J \$2.91

25 Martina designed a painting for art class, as shown in the drawing below. Her design contains 4 circles on a square canvas. Each circle has a radius of 6 inches. The circles touch the edges of the canvas and each other, as shown below.



The shaded section of Martina's design will be painted black. Which is closest to the area that will be painted black?

A 124 in.^{2}

B 463 in.^{2}

C 308 in.^{2}

D 116 in.^{2}

GO ON

26 A quadratic function is given below.

$$f(x) = 3x^2 - x + 6$$

What is $f(2)$?

F 40

G 28

H 16

J 4

27 Which of the following problems can be solved using the equation $5x + 35 = 50$?

A Tamara borrowed \$50 from a friend. The friend charged her 5% simple interest per month for x months. If Tamara pays her friend \$5 per month, after how many months will Tamara owe her friend \$35?

B It took Kyla 5 hours to ride her bike 35 miles. If Kyla continued riding at this same rate, how many hours, x, would it take her to ride 50 miles?

C Akashi made x deposits of \$5 each into his bank account. Then he withdrew \$35. If he had \$50 in his account, how many deposits did he make?

D Marcus purchased a new shirt for \$35 and 5 pairs of socks for x dollars a pair. Marcus spent a total of \$50. How much did each pair of socks cost?

28 Point S and point T are located on the same coordinate plane. Both the x-coordinate and the y-coordinate for point S are negative. Both the x-coordinate and the y-coordinate for point T are positive. Which statement about the line containing points S and T must be true?

F The graph of the line has a negative slope.

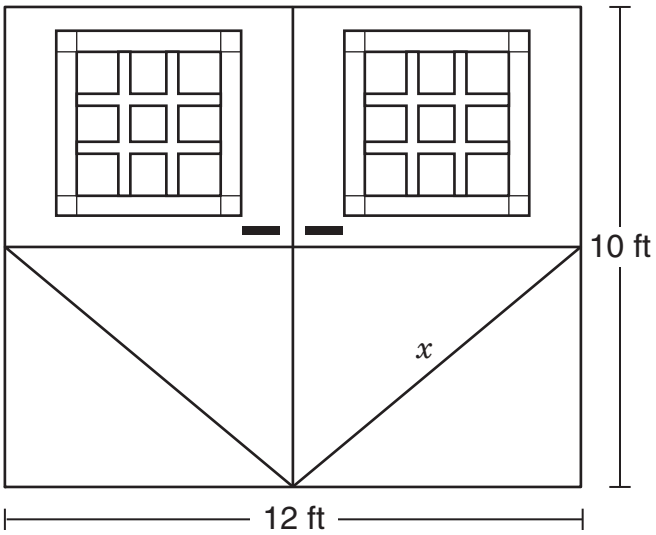
G The graph of the line has a positive slope.

H The graph of the line has a negative y-intercept.

J The graph of the line has a positive y-intercept.

GO ON

29 The two identical rectangular doors of a barn have glass panes in the top half, and each bottom half is made of solid wood, as shown below.



Which of the following measurements is closest to x, the length of the diagonal brace on the bottom half of each door?

A $6\frac{1}{2}$ ft

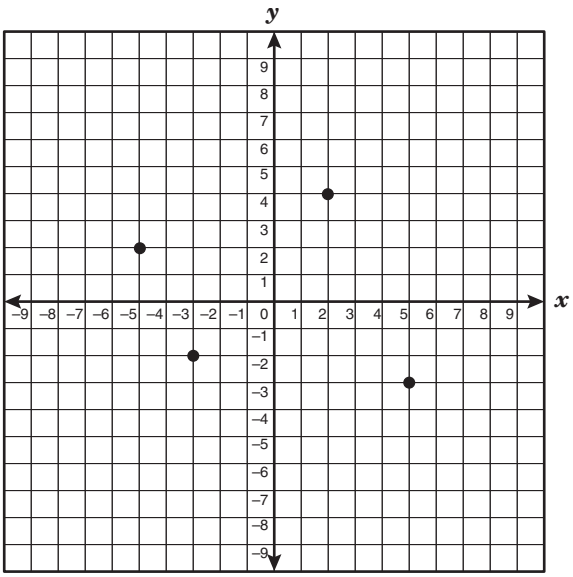
B 11 ft

C 8 ft

D $5\frac{1}{2}$ ft

GO ON

30 Which point on the grid below satisfies the conditions $x > -2$ and $y \leq 3$?



F $(-5, 2)$

G $(5, -3)$

H $(2, 4)$

J $(-3, -2)$

31 There are 8 sixth-grade classes and 195 sixth-grade students at Edison Middle School. The equation $8s = 195$ can be used to determine s, the mean number of students per class. Based on the solution $s = 24.375$, which of the following statements could be true?

A There are 5 sixth-grade classes with 24 students each and 3 sixth-grade classes with 25 students each.

B There are 7 sixth-grade classes with 24 students each and 1 sixth-grade class with 25 students.

C There are 8 sixth-grade classes with 25 students each.

D There are 8 sixth-grade classes with 24 students each.

32 The volume of a cube is $125x^3y^3$ cubic units, and the area of its base is $25x^2y^2$ square units. What is the length of an edge of the cube in units if $x > 0$ and $y > 0$?

F $\frac{5}{xy}$ units

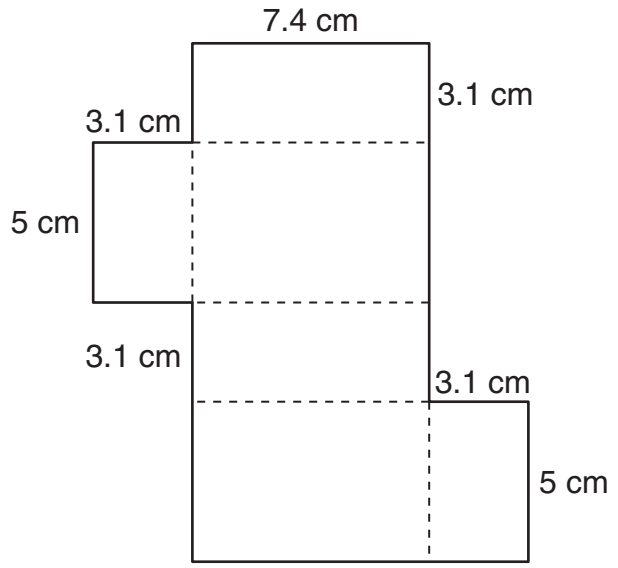
G $5x^5y^5$ units

H $5xy$ units

J $100xy$ units

GO ON

33 The net of a rectangular prism is shown below.



What is the total surface area of the rectangular prism represented by this net?

A 114.70 cm^2

B 150.88 cm^2

C 105.00 cm^2

D 119.88 cm^2

34 Carmen received a \$0.25 raise in her hourly pay rate. Her first paycheck after the raise showed a total pay of \$308 for 40 hours of work. Which method can be used to determine what Carmen's hourly pay rate was before the raise?

F Subtract 0.25 from 40 and then divide 308 by this difference

G Divide 308 by 40 and then add 0.25 to this quotient

H Multiply 0.25 by 40 and then divide 308 by this product

J Divide 308 by 40 and then subtract 0.25 from this quotient

35 If y is a function of x in $y = \frac{1}{2}x + 3$, which of the following statements is true?

A The independent variable, y, is 3 more than $\frac{1}{2}$ the dependent variable, x.

B The dependent variable, y, is 3 more than $\frac{1}{2}$ the independent variable, x.

C The independent variable, x, is 3 more than $\frac{1}{2}$ the dependent variable, y.

D The dependent variable, x, is 3 more than $\frac{1}{2}$ the independent variable, y.

36 Which expression is equivalent to 3 times the sum of x squared and 7?

F $3x^2 + 7$

G $(3x + 7)^2$

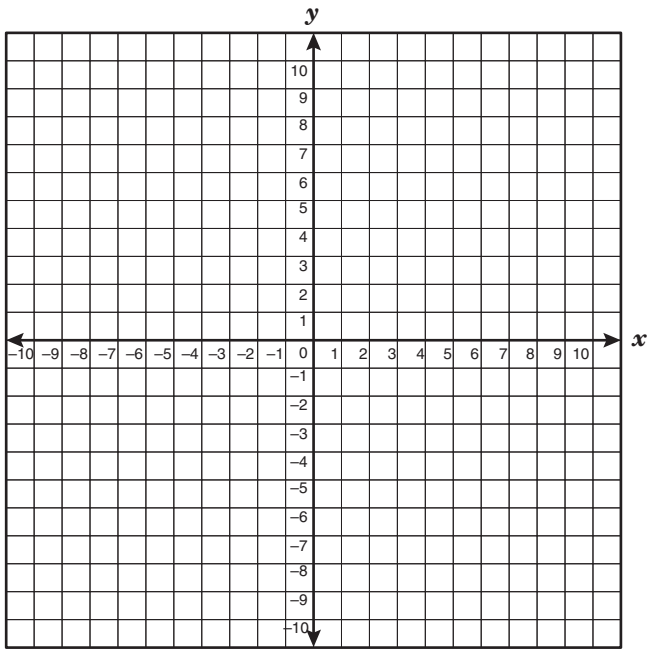
H $3(x + 7)^2$

J $3(x^2 + 7)$

GO ON

37 The table below shows ordered pairs of a linear function.

x	y
–6	–10
–3	–8
3	–4
6	–2



What are the x- and y-intercepts for the graph of this linear function?

A x-intercept: $(-6, 0)$
y-intercept: $(0, 9)$

B x-intercept: $(0, -6)$
y-intercept: $(9, 0)$

C x-intercept: $(0, 9)$
y-intercept: $(-6, 0)$

D x-intercept: $(9, 0)$
y-intercept: $(0, -6)$

38 Mr. Sylvester bought gardening supplies for \$79.75, not including tax. If the tax rate was 8%, what was the total cost of these gardening supplies, including tax?

F \$86.13

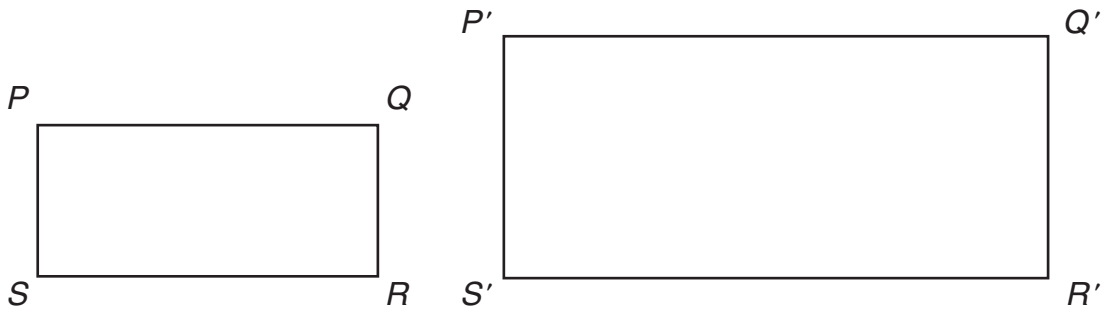
G \$73.37

H \$87.75

J Not here

GO ON

39 Use the ruler on the Mathematics Chart to measure the side lengths of rectangle $PQRS$ and rectangle $P'Q'R'S'$ to the nearest 0.1 centimeter.



Which of the following is closest to the scale factor used to dilate rectangle $PQRS$ to create rectangle $P'Q'R'S'$?

A 0.625

B 1.6

C 0.525

D 2.0

40 If the graph of $y = \frac{3}{4}x^2 - 1$ is translated up 4 units, which of the following equations represents the resulting graph?

F $y = 3x^2 - 4$

G $y = \frac{3}{4}x^2 + 3$

H $y = 3x^2 + 4$

J $y = \frac{3}{4}x^2 - 5$

41 A student tried to solve the following equation but made a mistake.

Step 1: $9 - 5(2x + 1) = -28$

Step 2: $4(2x + 1) = -28$

Step 3: $8x + 4 = -28$

Step 4: $8x = -32$

Step 5: $x = -4$

In which step did the mistake first appear?

A Step 2

B Step 3

C Step 4

D Step 5

GO ON

42 Desmond wants to take guitar lessons. The one-time registration fee is \$60, and each lesson costs \$40. Which of the following inequalities can Desmond use to determine x, the number of lessons he can take if he wants to spend no more than c dollars?

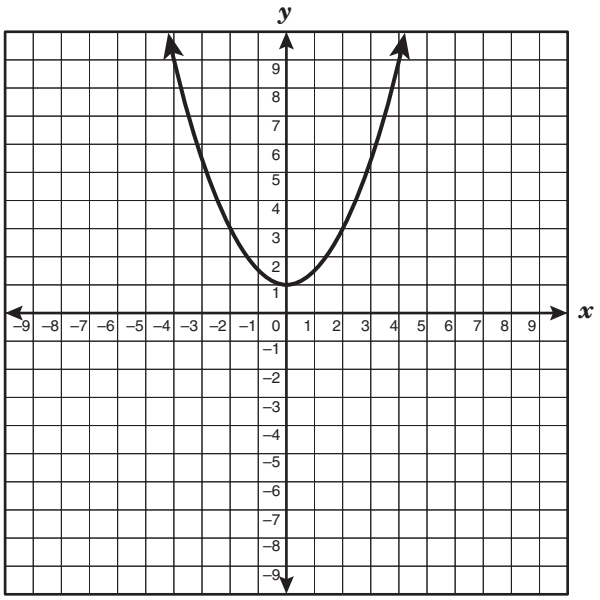
F $60x + 40x \leq c$

G $60 + 40x \leq c$

H $60x + 40x \geq c$

J $60 + 40x \geq c$

43 What is the parent function of the graph shown on the grid below?



A $y = -x$

B $y = -x^2$

C $y = x$

D $y = x^2$

44 Tyler wants to buy a video-game system for \$375. He can pay for the system in 12 months if he pays \$75 now and \$25 each month. How will the number of monthly payments be affected if Tyler pays \$75 now and \$30 each month?

F He will make 10 fewer monthly payments.

G He will make 2 fewer monthly payments.

H He will make 3 fewer monthly payments.

J He will make 5 fewer monthly payments.

45 A company designed a new label to completely cover the lateral surface area of a cylindrical can without any overlap. The can is $5\frac{1}{2}$ inches tall and 3 inches in diameter. Which of the following is closest to the area of this new label?

A 52 in.^{2}

B 160 in.^{2}

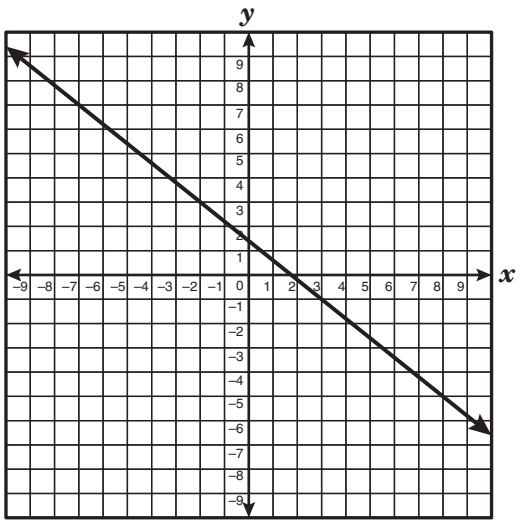
C 104 in.^{2}

D 66 in.^{2}

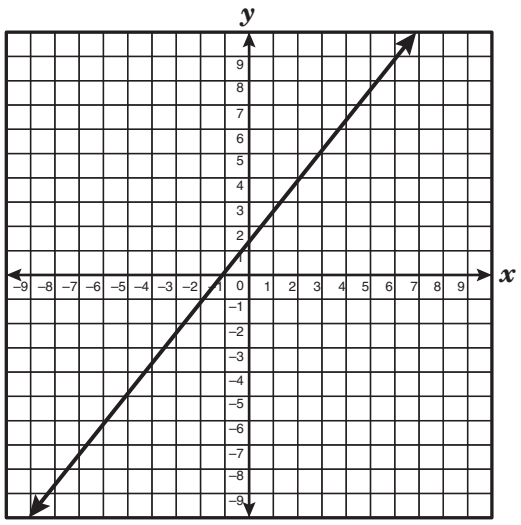
GO ON

46 Which graph best represents the function $y = 0.8x + 1.4$?

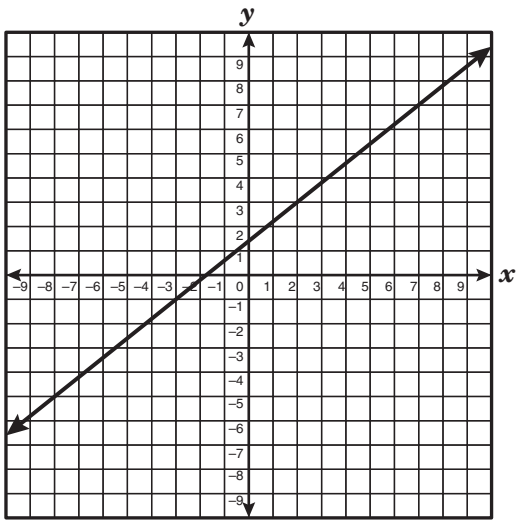
F



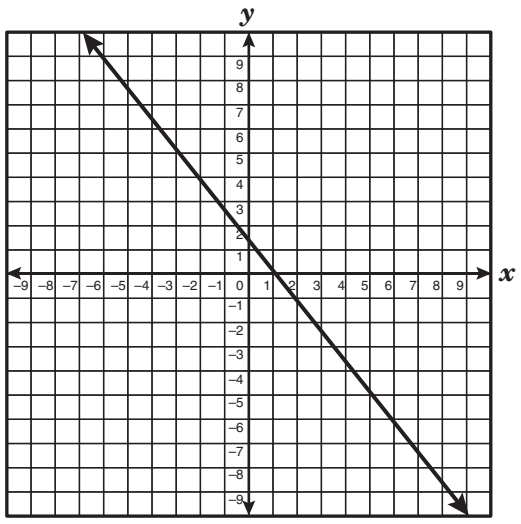
H



G



J



47 Which expression represents the area of a rectangle with sides measuring x^2y and $2xy^2$?

A $2x^3y^3$

B $2x^2y^2$

C $4x^4y^3$

D $4x^3y^4$

GO ON

48 The table shows values for the independent and dependent quantities in a functional relationship.

Independent Quantity	Dependent Quantity
0	8
1	7
2	6
3	5
4	4

Which function best represents this relationship?

F $f(x) = x + 8$

G $f(x) = x - 8$

H $f(x) = 8 - x$

J $f(x) = -8 - x$

49 Celeste made a model of her grandfather's fishing boat using a scale where 2 inches represents 3 feet. Her grandfather's actual boat is 28 feet long. What is the length of Celeste's model boat?

A $4\frac{2}{3}$ in.

B $18\frac{2}{3}$ in.

C 22 in.

D 42 in.

50 David wants to spread wildflower seeds in a rectangular field that is 60 feet wide and 70 feet long. Each package of wildflower seeds covers about 175 square feet and costs $6.95. Which of the following amounts is closest to the total cost of the wildflower seeds David needs for this field?

F $24.00

G $170.00

H $604.00

J $310.00

51 A school principal ordered 100 pizzas for a total of $1255. Cheese pizzas cost $11.50 each, and pepperoni pizzas cost $13.00 each. Which of the following systems of linear equations can be used to determine c, the number of cheese pizzas the principal ordered, and p, the number of pepperoni pizzas the principal ordered?

A $c + p = 100$
$13c + 11.50p = 1255$

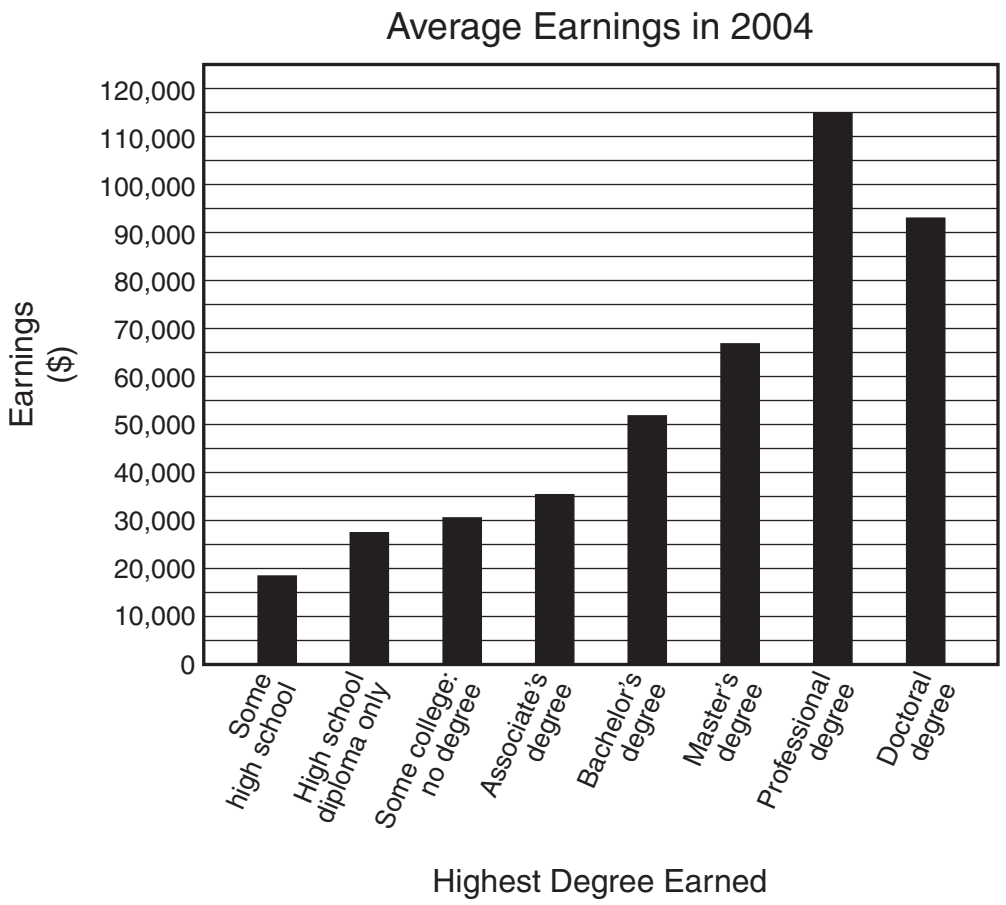
B $c - p = 100$
$13c + 11.50p = 1255$

C $c + p = 100$
$11.50c + 13p = 1255$

D $c - p = 100$
$11.50c + 13p = 1255$

GO ON

52 The graph below shows the 2004 average yearly earnings of people at least 18 years old according to the highest degree they have earned.



According to the graph, which of the following statements is true?

F In 2004 a person with an associate's degree earned more than twice as much as a person with a high school diploma.

G In 2004 a person with a high school diploma earned about $9,000 more than a person with only some high school.

H In 2004 a person with a doctoral degree earned less than 3 times as much as a person with a high school diploma.

J In 2004 a person with a high school diploma earned $100,000 less than a person with a professional degree.

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

STOP

TAKS GRADE 9
MATHEMATICS
APRIL 2009