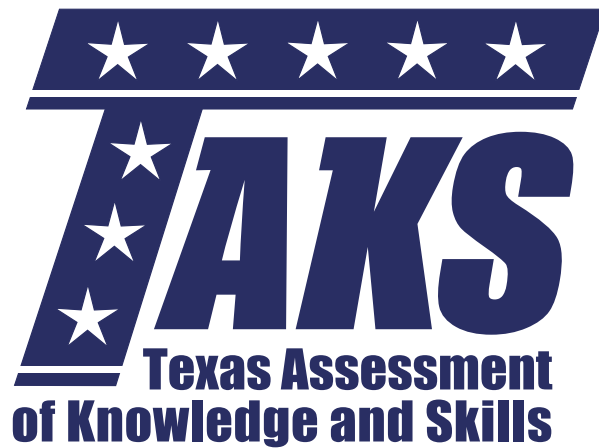


STUDENT NAME \_\_\_\_\_



**GRADE 9  
READING  
MATHEMATICS**

**Administered Spring 2004**

# 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 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 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.

# Mathematics Chart

<b>Perimeter</b>	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
<b>Circumference</b>	circle	$C = 2\pi r$ or $C = \pi d$
<b>Area</b>	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 $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
<b>Surface Area</b>	cube	$S = 6s^2$
	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	$S = 4\pi r^2$
<b>Volume</b>	prism or cylinder	$V = Bh^*$
	pyramid or cone	$V = \frac{1}{3}Bh^*$
	sphere	$V = \frac{4}{3}\pi r^3$
<i>*B represents the area of the Base of a solid figure.</i>		
<b>Pi</b>	$\pi$	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
<b>Pythagorean Theorem</b>		$a^2 + b^2 = c^2$
<b>Distance Formula</b>		$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
<b>Slope of a Line</b>		$m = \frac{y_2 - y_1}{x_2 - x_1}$
<b>Midpoint Formula</b>		$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
<b>Quadratic Formula</b>		$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
<b>Slope-Intercept Form of an Equation</b>		$y = mx + b$
<b>Point-Slope Form of an Equation</b>		$y - y_1 = m(x - x_1)$
<b>Standard Form of an Equation</b>		$Ax + By = C$
<b>Simple Interest Formula</b>		$I = prt$

## 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

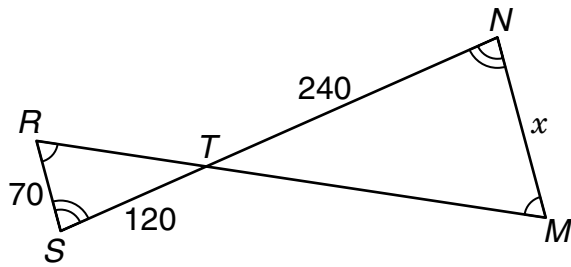
### SAMPLE B

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 If  $\triangle TSR$  is similar to  $\triangle TNM$ , what is the length of  $x$ ?



- A 240 units  
 B 140 units  
 C 120 units  
 D 70 units
- 2 How would the graph of the function  $y = x^2 + 4$  be affected if the function were changed to  $y = x^2 + 1$ ?
- F The graph would shift 3 units up.  
 G The graph would shift 3 units down.  
 H The graph would shift 3 units to the right.  
 J The graph would shift 3 units to the left.

- 3 The table shows the results of a survey given to 450 graduating seniors about their educational plans after high school.

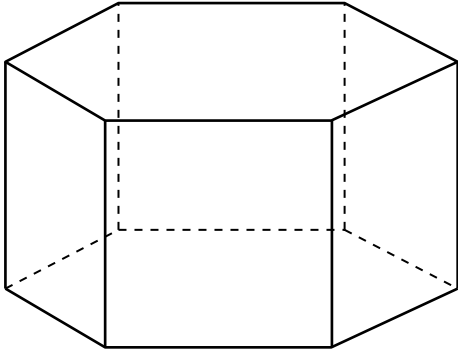
Educational Plans

Institution	Percent
University	44
Community college	26
Technical school	15
Undecided	15

Based on these data, which of the following statements is true?

- A Only 15 students have no future educational plans.  
 B More students plan to attend a community college or technical school than plan to attend a university.  
 C Fewer than half of the students plan to attend a university.  
 D Fewer than one-fourth of the students plan to attend a community college.

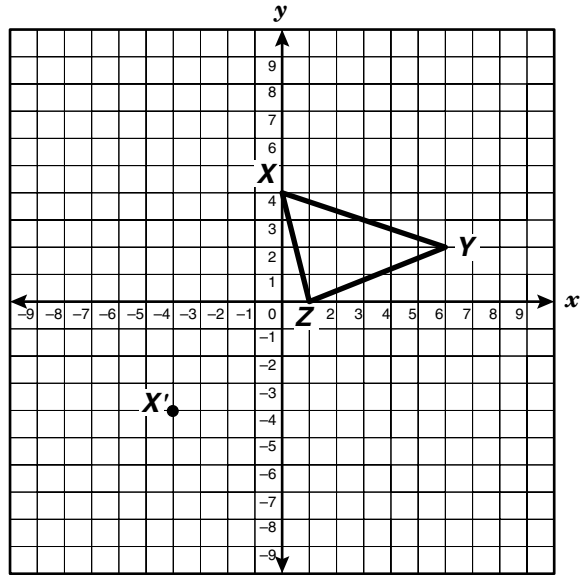
- 4 The drawing shows a 3-dimensional solid.



Which best represents the shape of the solid when viewed from the top?

- F Pentagon
  - G Hexagon
  - H Heptagon
  - J Octagon
- 5 A recycling center pays \$0.35 per pound of glass that it receives. If students at Falcon High School want to raise \$500 in a glass-recycling project, what is a reasonable number of pounds of glass they must collect?
- A 750 lb
  - B 175 lb
  - C 500 lb
  - D 1500 lb

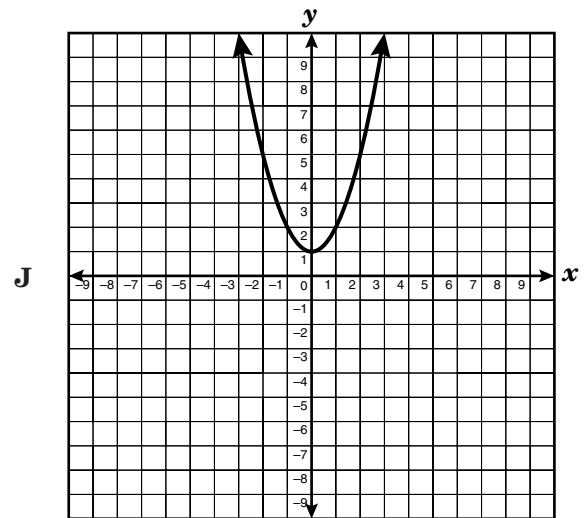
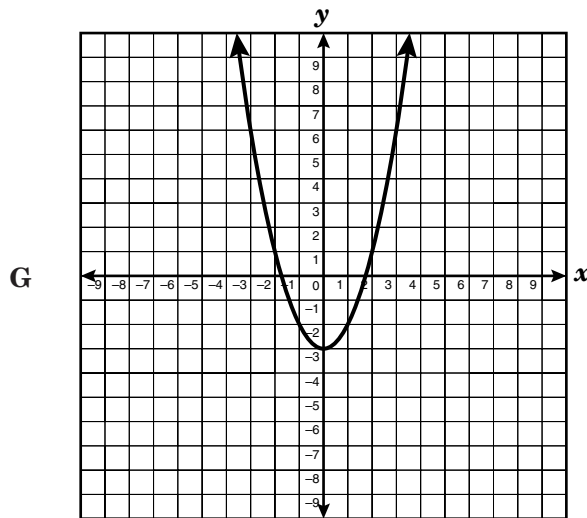
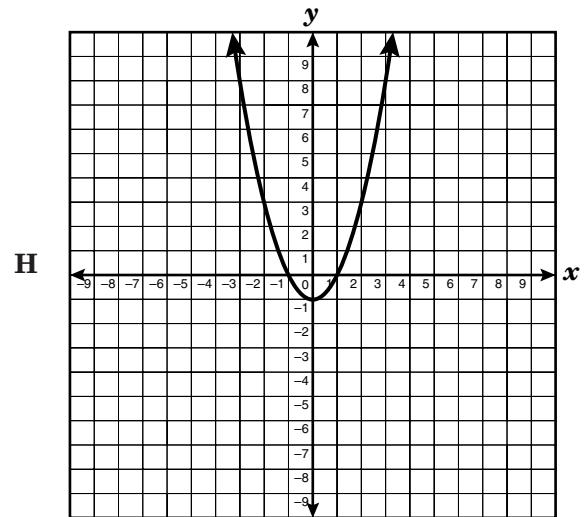
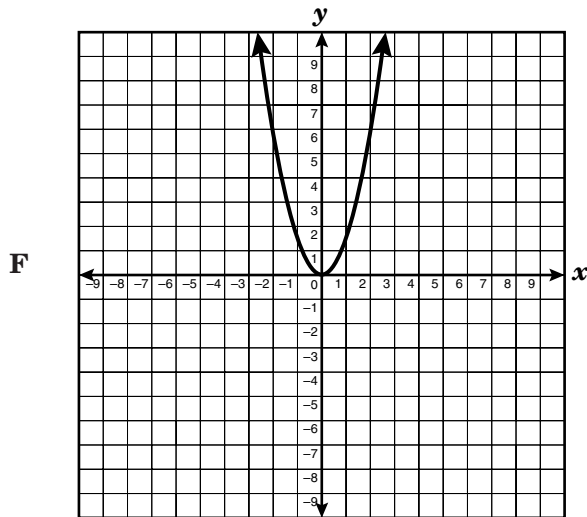
- 6 Triangle  $XYZ$  is translated so that  $X$  is mapped to  $X'$ .



Which coordinate pair best represents  $Y'$ ?

- F  $(-3, -8)$
  - G  $(2, -7)$
  - H  $(2, -6)$
  - J  $(2, -2)$
- 7 A weather balloon is launched from a height of 475 feet above sea level. If the balloon rises at a constant rate of 85 feet per minute, which equation could be used to determine  $t$ , the time in minutes it will take the balloon to reach a height of 9245 feet above sea level?
- A  $9245 = 85 + 475t$
  - B  $9245 = 85(t + 475)$
  - C  $9245 = 475 + 85t$
  - D  $9245 = (475 + 85)t$

8 Which graph shows a function  $y = x^2 + c$  when  $c < -1$ ?



9 Which expression is equivalent to  $\frac{(8x^3)(2x^5)}{4x^6}$ ?

- A  $4x^9$
- B  $4x^2$
- C  $2x^8$
- D  $2x^4$

10 Which equation describes a line that has a  $y$ -intercept of 5 and a slope of  $\frac{1}{2}$ ?

**F**  $y = 5 + \frac{1}{2}x$

**G**  $y = (5 + x)\frac{1}{2}$

**H**  $y = 5x + \frac{1}{2}$

**J**  $y = (5x + 1)\frac{1}{2}$



15 Mr. Collins invested some money that will double in value every 12 years. If he invested \$5,000 on the day of his daughter's birth, how much will the investment be worth on his daughter's 60th birthday?

- A \$300,000
- B \$160,000
- C \$80,000
- D \$320,000

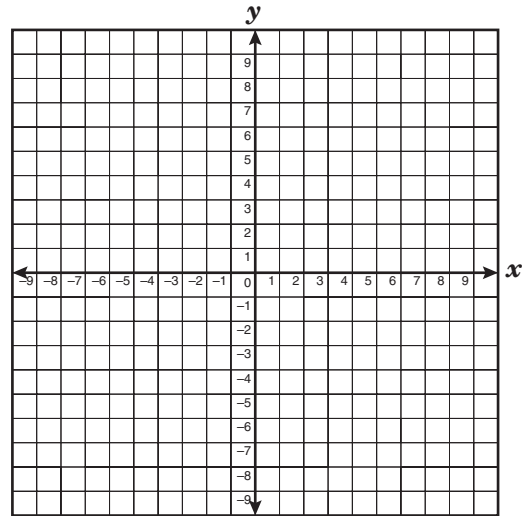
16 The area of a rectangle is  $3x^2 + 14x + 8$ , and the width is  $x + 4$ . Which expression best describes the rectangle's length?

- F  $3x + 2$
- G  $2x + 4$
- H  $2x + 2$
- J  $3x - 2$

17 If  $(x, -4)$  is a solution to the equation  $4x - 5y = 8$ , what is the value of  $x$ ?

- A -4.8
- B -3
- C 1.6
- D 7

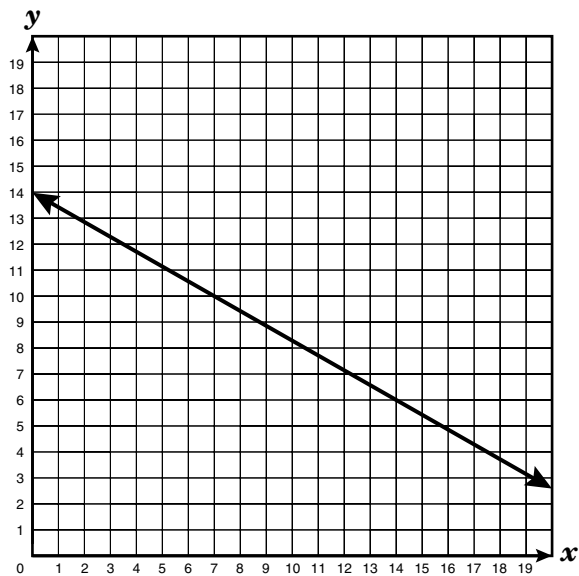
18  $\triangle DFG$  has vertices  $D(2, 4)$ ,  $F(4, 8)$ , and  $G(6, 4)$ .



$\triangle DFG$  is dilated by a scale factor of  $\frac{1}{4}$  and has the origin as the center of dilation. What are the coordinates of  $F'$ ?

- F (1, 2)
- G  $(\frac{1}{2}, 1)$
- H (16, 32)
- J  $(\frac{3}{2}, 1)$

- 19 What is the slope of the linear function shown in the graph?

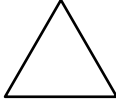
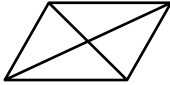
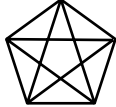
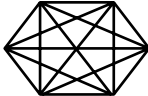


- A  $-\frac{7}{4}$   
B  $-\frac{4}{7}$   
C  $\frac{4}{7}$   
D  $\frac{7}{4}$

- 20 Simplify the algebraic expression  $3(x + 3) - 2(x + 3)$ .

- F  $x + 3$   
G  $x - 3$   
H  $-6x^2 - 54$   
J  $6x^2 + 3$

21 The table below shows the number of sides and diagonals in certain polygons.

Number of Sides	Diagram	Number of Diagonals
3		0
4		2
5		5
6		9

Based on the table, how many diagonals should a 9-sided convex polygon have?

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

**22** A cylindrical water tank has a radius of 2.8 feet and a height of 5.6 feet. The water tank is filled to the top. If water can be pumped out at a rate of 36 cubic feet per minute, about how long will it take to empty the water tank?

**F** 3 h

**G** 2 h

**H** 4 min

**J** 1 min

**23** The amount of material needed to make a basketball best represents the ball's —

**A** volume

**B** surface area

**C** circumference

**D** perimeter

- 24 Jerome received a gift card for \$20 worth of video rentals from a video store. If the cost of renting a video is \$2.50, which table best describes  $b$ , the balance remaining on the gift card after he rents  $n$  videos?

F

$n$	$b$
0	\$20.00
1	\$17.50
2	\$15.00
4	\$10.00
6	\$5.00

H

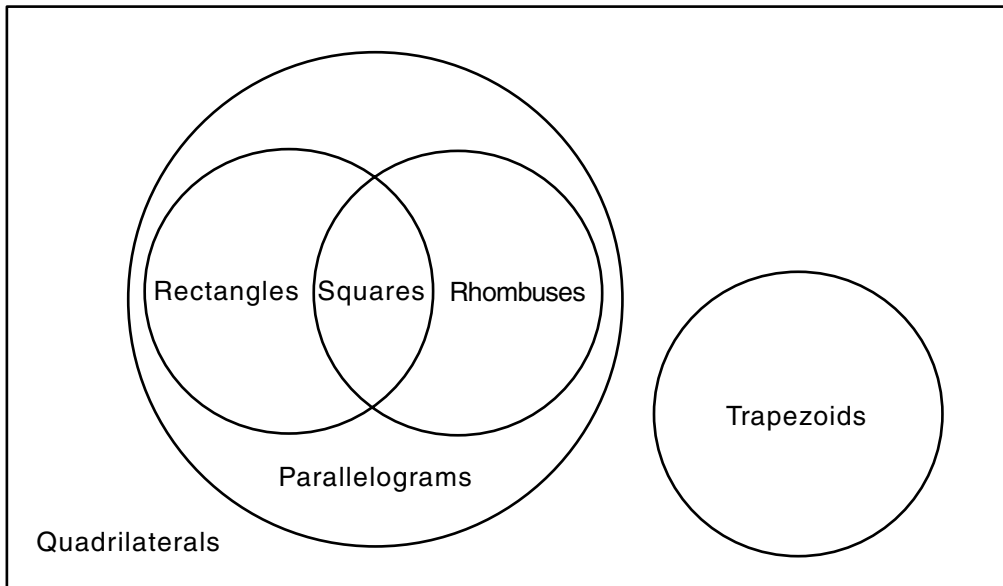
$n$	$b$
1	\$17.50
2	\$15.00
3	\$13.50
4	\$11.00
5	\$8.50

G

$n$	$b$
0	\$20.00
2	\$17.50
4	\$15.00
6	\$12.50
8	\$10.00

J

$n$	$b$
0	\$20.00
1	\$15.00
4	\$10.00
6	\$2.50
8	\$0.00



25 Which of the following is a valid conclusion based on the diagram shown above?

- A All rhombuses are squares.
- B All rhombuses are rectangles.
- C All quadrilaterals are parallelograms.
- D All rectangles are parallelograms.

26 A square park has a diagonal walkway from 1 corner to another. If the walkway is about 38 yards long, what is the approximate length of each side of the park?

- F 6 yd
- G 19 yd
- H 27 yd
- J 54 yd

- 27 The temperature in degrees Celsius,  $C$ , is  $\frac{5}{9}$  of the difference between the temperature in degrees Fahrenheit,  $F$ , and the constant 32. Which equation best represents this relationship?

A  $C = \frac{5}{9} - (F + 32)$

B  $C = \frac{5}{9}(F + 32)$

C  $C = \frac{5}{9}(F - 32)$

D  $C = \frac{5}{9} - F + 32$

- 28 Sean is an Algebra I student who believes that  $xy^2 = (xy)^2$ . Rudy informs Sean that this theory is not always true. Which pair of values for  $x$  and  $y$  could Rudy use to disprove Sean's theory?

F  $x = 0$  and  $y = 2$

G  $x = 1$  and  $y = 2$

H  $x = 2$  and  $y = 0$

J  $x = 2$  and  $y = 1$

- 29 Tony and Edwin each built a rectangular garden. Tony's garden is twice as long and twice as wide as Edwin's garden. If the area of Edwin's garden is 600 square feet, what is the area of Tony's garden?

A 1200 ft<sup>2</sup>

B 2400 ft<sup>2</sup>

C 3600 ft<sup>2</sup>

D 4800 ft<sup>2</sup>

- 30 An artist made a drawing of a house with a tree next to it. The drawing is  $\frac{1}{18}$  the size of the actual house and tree. The tallest point of the house is 12 feet 8 inches, and the tree is 27 feet tall. How many inches tall is the tree in the drawing?

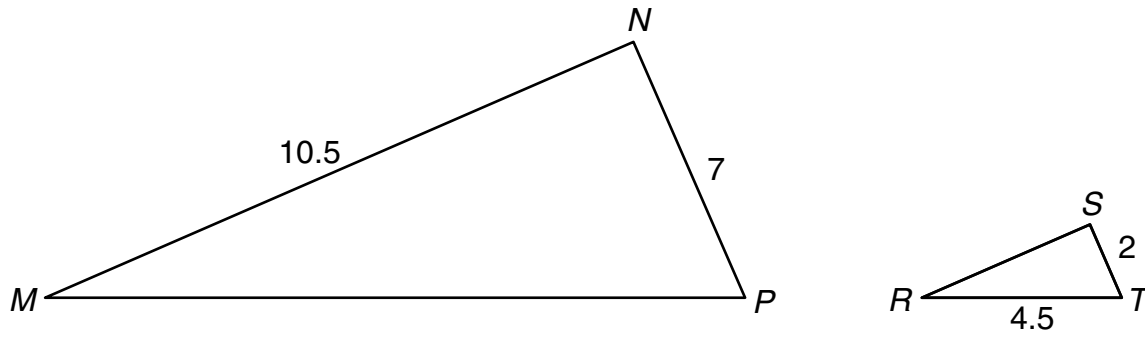
F 8.4 in.

G 18 in.

H 23.4 in.

J 486 in.

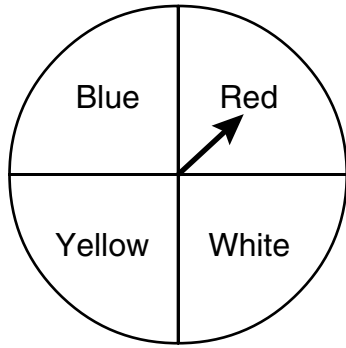
31  $\triangle MNP \sim \triangle RST$  is shown below.



Which scale factor was used to transform  $\triangle MNP$  to  $\triangle RST$ ?

- A  $\frac{1}{3}$
- B  $\frac{1}{2}$
- C  $\frac{2}{7}$
- D 5

32 A spinner was spun 20 times. The results are shown in the table below.



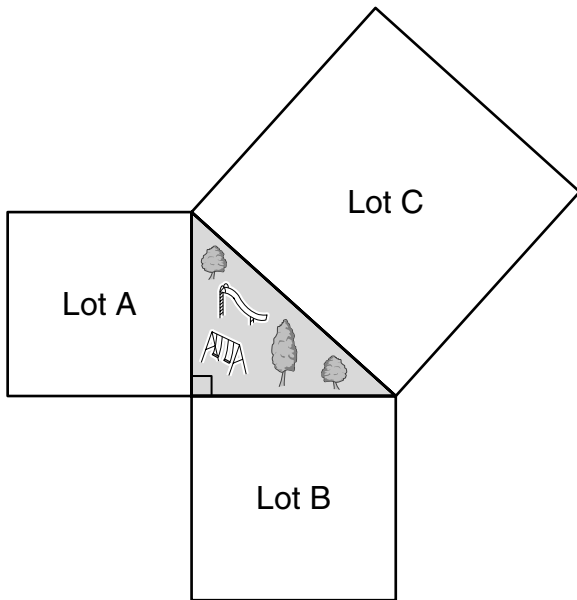
Spinner Results

Red	7
White	5
Blue	4
Yellow	4

Which color on the spinner has the same experimental probability as theoretical probability?

- F** Red
- G** White
- H** Blue
- J** Yellow

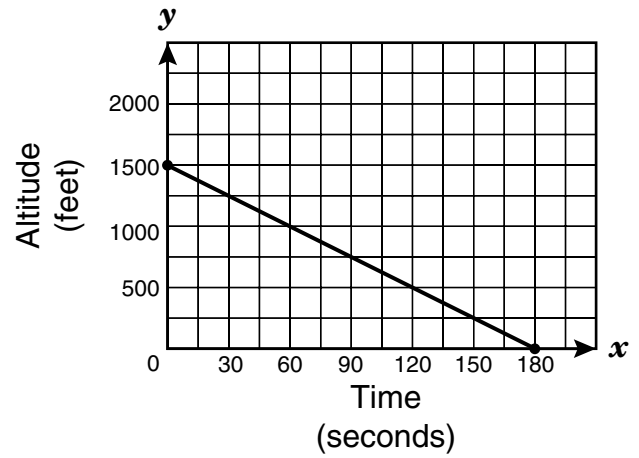
- 33 The drawing below shows 3 square parking lots that enclose a grassy area shaped like a right triangle.



If Lot A's perimeter is 300 yards and Lot B's perimeter is 400 yards, what is the perimeter of Lot C?

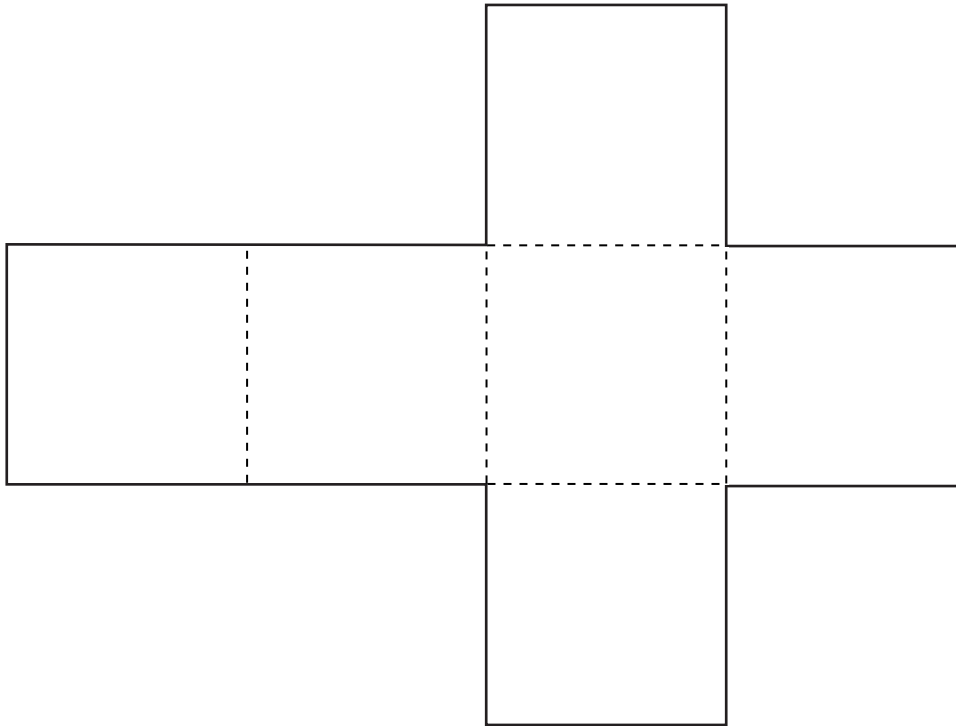
- A 500 yd
- B 700 yd
- C 1400 yd
- D 2000 yd

- 34 The line segment on the graph shows the altitude of a landing airplane from the time its wheels are lowered to the time it touches the ground. Which of the following best describes the slope of the line segment?



- F The plane descends about 1 foot per 8 seconds.
- G The plane descends about 8 feet per second.
- H The plane descends about 1 foot per 2 seconds.
- J The plane descends about 2 feet per second.

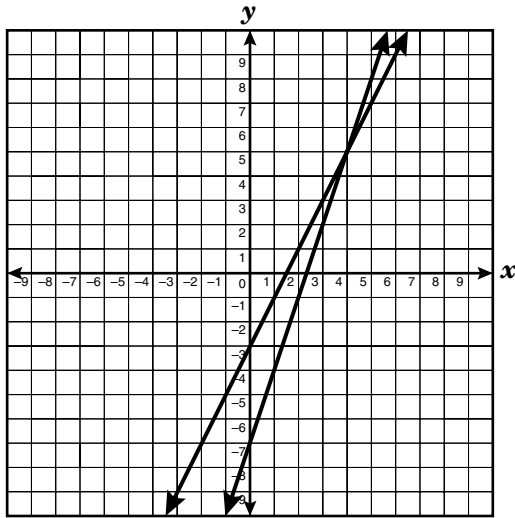
35 The net of a cube is shown below.



Use the ruler on the Mathematics Chart to measure the dimensions of the cube to the nearest  $\frac{1}{4}$  inch.  
Find the surface area of the cube to the nearest square inch.

- A 2 in.<sup>2</sup>
- B 9 in.<sup>2</sup>
- C 14 in.<sup>2</sup>
- D 18 in.<sup>2</sup>

- 36 The graphs of the linear equations  $y = 2x - 3$  and  $y = 3x - 7$  are shown below.



If  $2x - 3 = 3x - 7$ , what is the value of  $x$ ?

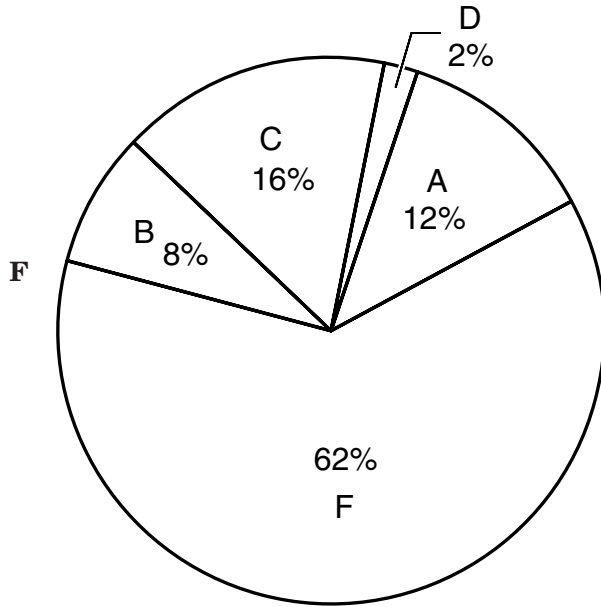
- F** 4  
**G** 5  
**H** 9  
**J** 10
- 37 The scale factor of two similar polygons is 2:3. The perimeter of the larger polygon is 150 centimeters. What is the perimeter of the smaller polygon?
- A** 100 cm  
**B** 75 cm  
**C** 50 cm  
**D** 150 cm

- 38 Adam's age is 4 years less than twice Blanca's age. If Adam is 16 years old, which equation can be used to determine Blanca's age?

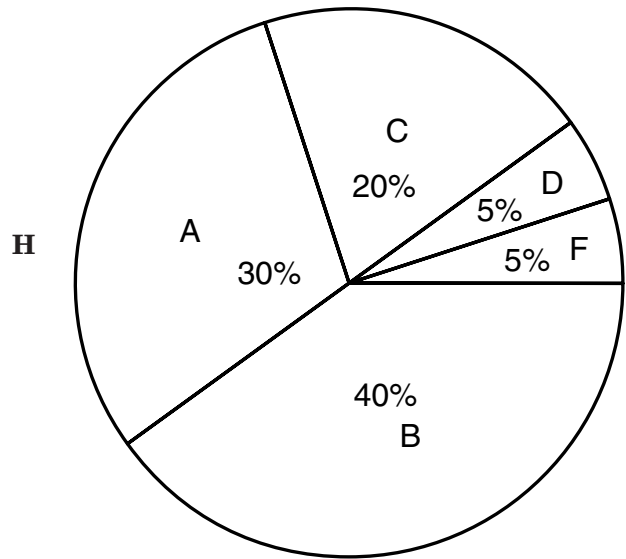
- F**  $2(x - 4) = 16$   
**G**  $2x - 4 = 16$   
**H**  $4 - 2x = 16$   
**J**  $2(4 - x) = 16$
- 39 The Frosty Ice-Cream Shop sells sundaes for \$2 and banana splits for \$3. On a hot summer day, the shop sold 8 more sundaes than banana splits and made \$156. Which system of equations could be used to find the number of sundaes,  $s$ , and banana splits,  $b$ , that the shop sold that day?
- A**  $2s + 3b = 156$   
 $s = b + 8$   
**B**  $2b + 3s = 156$   
 $s + b = 8$   
**C**  $2s + 3b = 8$   
 $s = b + 156$   
**D**  $2s + 3b = 156$   
 $b - s = 8$

- 40 Students in two honors history classes took their first test. Of 40 students taking the test, 12 received an A, 16 received a B, 8 received a C, 2 received a D, and the remaining received an F. Which circle graph best represents these data?

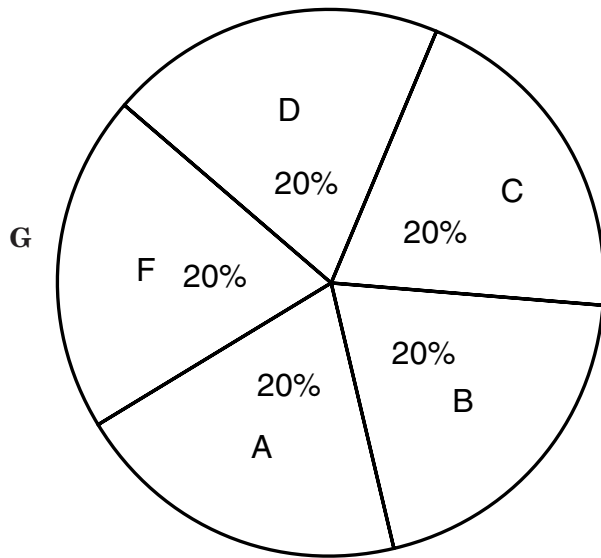
History Test Grades



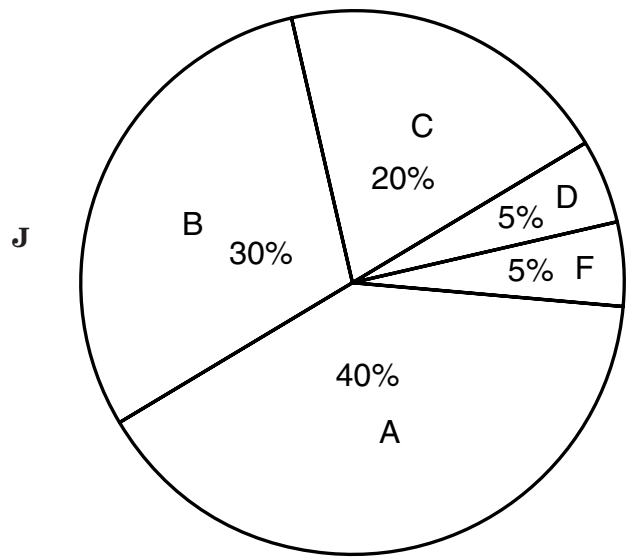
History Test Grades



History Test Grades



History Test Grades

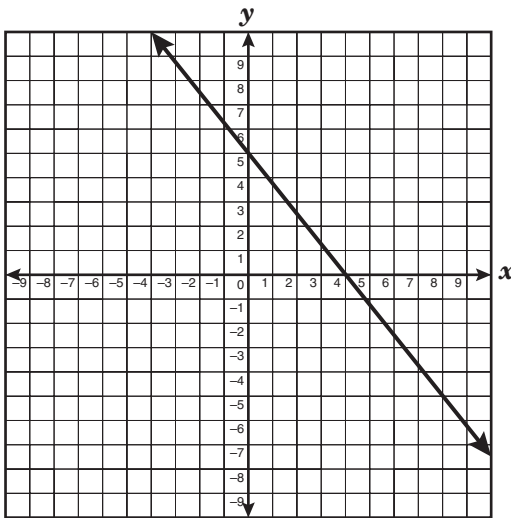


- 41 Which equation could be used to generate this table of values?

$x$	$y$
-1	2
0	1
1	2
2	5

- A  $y = -2x$   
 B  $y = 2x + 1$   
 C  $y = x + 1$   
 D  $y = x^2 + 1$

- 42 What are the  $x$ - and  $y$ -intercepts of the function graphed below?



- F (4, 0) and (5, 0)  
 G (4, 0) and (0, 5)  
 H (0, 4) and (5, 0)  
 J (0, 4) and (0, 5)

- 43 Sue wants to write an expression that will always produce an even integer. Which of the following will always produce an even integer for any given integer,  $n$ ?

- A  $2n + 1$   
 B  $2n - 1$   
 C  $n + 2$   
 D  $2n$

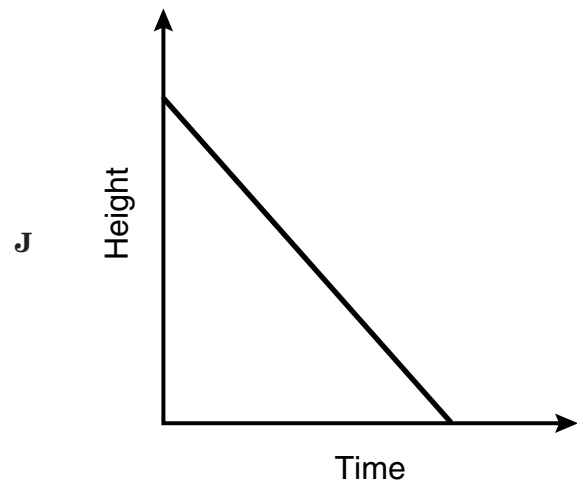
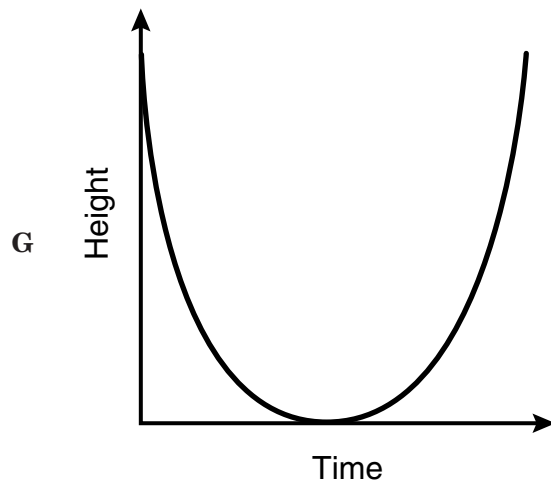
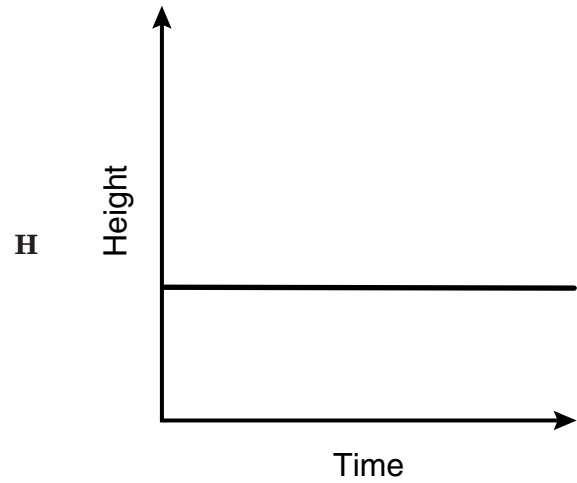
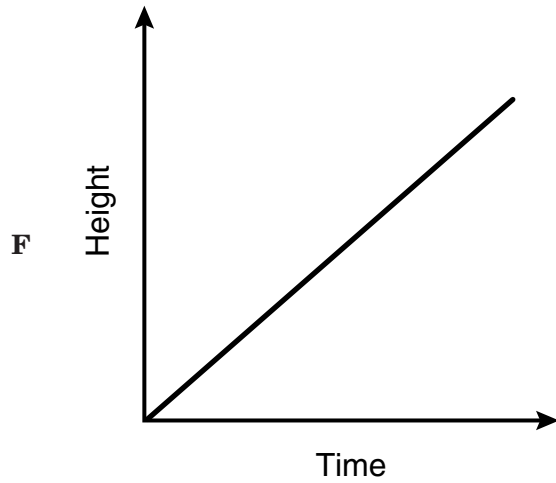
- 44 If  $y = x^3$ , what is equivalent to  $x^{12}$ ?

- F  $y^{36}$   
 G  $y^{15}$   
 H  $y^9$   
 J  $y^4$

- 45 A class consists of 8 freshmen and 22 sophomores. Freshmen had an average of  $x$  points on a test, while sophomores had an average of  $y$  points. Which expression gives the average test score per student for the entire class?

- A  $\frac{8x + 22y}{30}$   
 B  $\frac{22x + 8y}{30}$   
 C  $30\left(\frac{8}{x} + \frac{y}{22}\right)$   
 D  $\frac{x + y}{2}$

- 46 Which graph best represents the relationship between the height of a burning candle and the amount of time that passes as the candle burns?



- 47 Which statement is true for the graph below?



- A Ms. Goodlett will earn \$500 if she sells \$5000 worth of merchandise.
- B Mr. Murphy will not earn any money if he does not sell any merchandise.
- C Mr. Laster will earn \$1000 if he sells \$1000 worth of merchandise.
- D Ms. Cho will earn \$700 if she sells \$5000 worth of merchandise.
- 48 Jake's square backyard covers an area of 104 square meters. How can Jake best determine the length of each side of his backyard?
- F Divide the area by the number of sides
- G Square the area
- H Find the square root of the area
- J Divide the area in half

- 49 Ms. Hill wants to carpet her rectangular living room, which measures 14 feet by 11 feet. If the carpet she wants to purchase costs \$1.50 per square foot, including tax, how much will it cost to carpet her living room?

- A \$50
- B \$75
- C \$154
- D \$231

- 50 Which equation best describes the relationship between the corresponding values of  $x$  and  $y$  shown in the table?

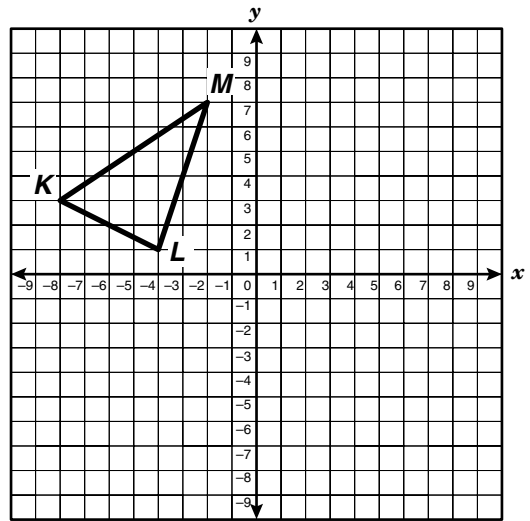
$x$	$y$
-2	-12
0	-6
1	-3
4	6

- F  $y = x - 10$
- G  $y = 2x - 8$
- H  $y = 3x - 6$
- J  $y = x^2 - 8$

**51** A middle school band must be at the contest site by 8:00 A.M. to participate in a competition. It takes 45 minutes to load the bus with the band's equipment, and it takes 1 hour 45 minutes to travel to the contest site. What should be the first step in determining the band's departure time?

- A** Add the time it takes to travel to the contest site to 8:00 A.M.
- B** Add the time it takes to load the bus to 8:00 A.M.
- C** Add the travel time and loading time together
- D** Subtract the loading time from the travel time

**52**  $\triangle KLM$  has coordinates  $K(-8, 3)$ ,  $L(-4, 1)$ , and  $M(-2, 7)$ . What will be the new coordinates of point  $M$  if the triangle is translated 4 units to the right and 3 units down?



- F**  $(0, -2)$
- G**  $(2, 4)$
- H**  $(-4, 0)$
- J**  $(-6, 4)$

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



