

# DIRECTIONS

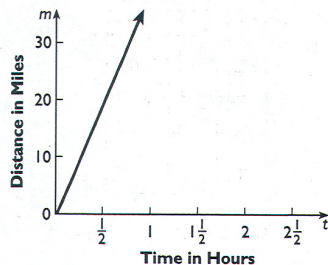
Read each question and choose the best answer. Then mark the space for the answer you have chosen.

1. The speed of light in a vacuum is about 300,000,000 meters per second. Which expression is another way to represent this value?

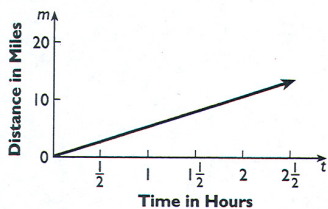
A  $3 \times 10^{10}$  m/s  
 B  $3 \times 10^9$  m/s  
 C  $3 \times 10^8$  m/s  
 D  $3 \times 10^7$  m/s

2. Which graph best represents the distance covered by someone biking at a rate of 15 miles an hour?

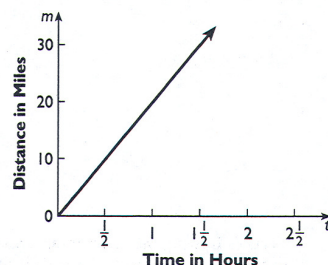
A



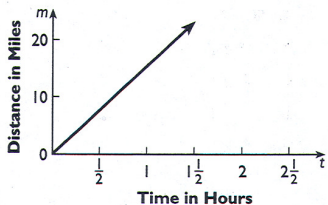
B



C



D



3. Juan has 8 coins in his pocket, all in dimes and nickels. The coins are worth 55 cents. The system of equations below describes the number of nickels,  $n$ , and dimes,  $d$ , that Juan has in his pocket. Solve the system of equations to find the number of dimes,  $d$ , that Juan has in his pocket.

$$\begin{aligned} d + n &= 8 \\ 10d + 5n &= 55 \end{aligned}$$

A 2  
 B 3  
 C 4  
 D 5

CONTINUE

4. What are the solutions to this equation?

$$x^2 + 3x - 10 = 0$$

A -5, 2  
 B -2, 5  
 C 2, 5  
 D no solution

5. Water is flowing into a circular drum so that the volume of water in the drum in  $t$  minutes is  $V$  gallons, given by the function  $V(t) = 45 + 15t^2$ . Find  $V(3)$ .

A 59 gal  
 B 135 gal  
 C 180 gal  
 D 540 gal

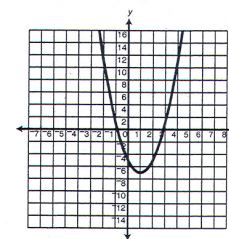
5.  $9 \times (2 + 6) = (2 + 6) \times 9$   
 Which property justifies this equation?

A Associative Property of Addition  
 B Associative Property of Multiplication  
 C Commutative Property of Addition  
 D Commutative Property of Multiplication

7. An interior decorating company needs to carpet a room that is three times as long as it is wide. If the width of the carpet is  $w$  feet and the carpet costs \$1.05 per square foot, which equation describes the price,  $P$ , that it will cost to carpet the room?

A  $P = 1.05(3w)$   
 B  $P = 1.05(4w)$   
 C  $P = 1.05(3w^2)$   
 D  $P = 1.05(4w^2)$

8. Choose the best estimate for the roots of the equation graphed below.

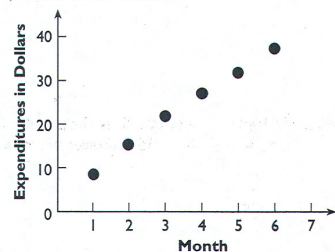


A The equation has no real roots  
 B  $x = -5, x = 15$   
 C  $x = -15, x = 5$   
 D  $x = -1, x = 3$

CONTINUE

9. Karen sold 4 prints at an art show. Their prices were \$29.00, \$58.00, \$42.50, and \$26.50. What was the mean selling price?
- A \$34.50  
B \$39.00  
C \$52.00  
D \$194.25

10. The scatter plot shows the year-to-date expenditures for miscellaneous office supplies at a real estate office. What is the best estimate for the expenditure at the end of the seventh month?



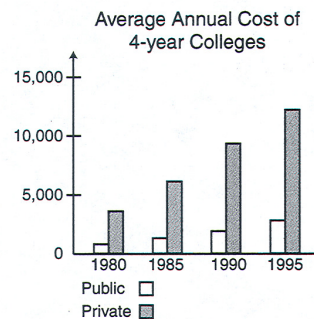
- A \$30  
B \$35  
C \$40  
D \$45

11. Which is equal to  $2[3 - (7^2 - 5 \cdot 8)]$ ?
- A 12  
B -12  
C 36  
D -36

12. What is the domain of the relation  $\{(-6, -1), (-2, -2), (5, 1), (-2, 3), (8, 1), (9, -1)\}$ ?
- A  $\{-2, -1, 1, 3\}$   
B  $\{-6, -2, 5, 8, 9\}$   
C  $-6 \leq x \leq 9$   
D  $\{-6, -2, -1, 1, 3, 5, 8, 9\}$

CONTINUE

13. This graph shows the average cost of attending public and private 4-year colleges.



In which year was the difference between the costs the greatest?

- A 1980  
B 1985  
C 1990  
D 1995
14. What are the approximate solutions of  $3x^2 + 2x - 4 = 0$ ?
- A 0.8 and -1.6  
B -0.9 and 1.6  
C -0.8 and -1.5  
D 0.9 and -1.5

15.  $f(y) = 4y^2 - 6y$  and  $g(y) = 2y^2 - 8$ . What is  $f(y) - g(y)$ ?
- A  $2y^2 - 6y - 8$   
B  $2y^2 - 6y + 8$   
C  $4y^2 - 4y - 8$   
D  $6y^2 - 4y + 8$

16. In how many points does the graph of  $f(x) = x^2 - 8x + 16$  intersect the  $x$ -axis?
- A None  
B One  
C Two  
D More than two

CONTINUE

18.  $6 \times (5 + 1) = 6 \times 5 + 6 \times 1$   
Which property justifies this equation?
- A Associative Property of Addition  
B Associative Property of Multiplication  
C Commutative Property of Addition  
D Distributive Property

19. Which expression is equivalent to  $\frac{x^8 y^9}{x^3 y^8}$ ?
- A  $\frac{14}{11}$   
B  $\frac{y}{x^2}$   
C  $x^2 y$   
D  $x^8 y^{17}$

20. You heard thunder about 3 seconds after you saw lightning strike. The lightning was about 15 miles away. Which equation is a direct variation relating the time and distance in this situation?
- A  $y = x + 12$   
B  $y = x + 15$   
C  $y = \frac{1}{5}x$   
D  $y = x - 3$

21. Which of the following tables is generated by  $g(x) = x^3 - 1$ ?

A

$x$	-2	0	2
$g(x)$	8	0	-8

B

$x$	-2	0	2
$g(x)$	-7	1	9

C

$x$	-2	0	2
$g(x)$	-9	-1	7

D

$x$	-2	0	2
$g(x)$	-8	0	8

23. Which equation represents a line that has a slope of 2 and that passes through  $(-4, 5)$ ?

- A  $y + 5 = 2x - 4$   
B  $y - 5 = 2x - 4$   
C  $y - 5 = 2x + 4$   
D  $y - 5 = 2(x + 4)$

25. The sum of Carlota's scores on her first two algebra tests was 182 points. Her score on the second test was 100 less than twice the score on her first test. What did she score on each test?

- A 94 on the first test; 88 on the second  
B 92 on the first test; 90 on the second  
C 90 on the first test; 92 on the second  
D 88 on the first test; 94 on the second

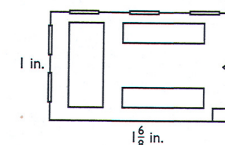
29. Eric wants to drink 16 ounces of water at lunch and 10 ounces of water for every mile he hikes. Which number sentence can you use to find the amount of water he should bring on a 5-mile hike?

- A  $\frac{5}{10} + 16 = x$   
B  $\frac{10}{5} + 16 = x$   
C  $16 \times \frac{10}{5} = x$   
D  $16 + 10 \times 5 = x$

30. The equation  $h = 275t + 1486$  gives the altitude, in feet, of a mountain-climbing team  $t$  hours after they begin their climb. If they are at 2448.5 feet, how long have they been climbing?

- A 2.25 hours  
B 3.5 hours  
C 7 hours  
D 14.3 hours

31. A floor plan for a room is shown. The scale of  $\frac{1}{32}$  inch in the drawing represents 1 foot in the actual room. Find the dimensions of the room.



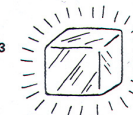
- A 48 feet by 32 feet  
B 56 feet by 32 feet  
C 32 feet by 24 feet  
D 24 feet by 42 feet

34. A line parallel to  $y = \frac{2}{3}x - 7$  is

- A  $y = \frac{2}{3}x + 7$   
B  $y = -\frac{2}{3}x - 7$   
C  $y = -\frac{3}{2}x + 7$   
D  $y = \frac{3}{2}x + 20$

40. Gold has a density of 17.77 grams per cubic centimeter.

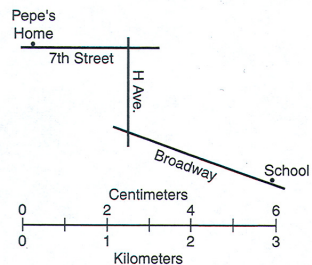
17.77 grams/cm<sup>3</sup>



What is that number rounded to the nearest tenth?

- A 17.0  
B 17.79  
C 17.8  
D 18.0

41. Every day, Pepe walks to school and back home along the route shown in the map. Approximately what is the total distance Pepe walks to and from school each day, both ways?



- A 8 kilometers  
B 9 kilometers  
C 10 kilometers  
D 11 kilometers
42. What unit would you use to measure the gasoline in a tank?  
A yards  
B liters  
C milligrams  
D kilograms
45. What can you say about the solutions of the equation  $y^2 - 4 = 6$ ?  
A No solutions  
B Two irrational solutions  
C Two rational solutions  
D Two positive solutions

47. If the graph of  $y = x^2$  is shifted three units downward, what is the new equation of the graph?

- A  $y = x^2 + 3$   
B  $y + 3 = x^2$   
C  $y = x^2 - 6$   
D  $y = -3x^2$

48. In one decade, the population of a country increased in a way that each year the population growth was higher than in the year before. What type of function best models this situation?

- A Logarithmic  
B Exponential  
C Linear  
D Trigonometric

49. Choose the function that fits the values in the table below:

$x$	-2	0	2
$f(x)$	2	0	6

- A  $f(x) = x^2 + x$   
B  $f(x) = x^3$   
C  $f(x) = x^2 + x + 1$   
D  $f(x) = e^{2x}$

50. A biology experiment is started with 5,000,000 cells and 45% of the cells are dying every minute. The following table shows the number of cells remaining as each minute passes. What kind of phenomenon does this situation represent?

Time (min)	Cell count
0	5,000,000
1	2,750,000
2	1,512,500
3	831,875

- A Exponential decay  
B Periodicity  
C Exponential growth  
D Linear decay

52. EPA has hired you to investigate a possible violation of the Clean Air Act. You travel to a factory to measure the rate at which the factory's smokestack is emitting soot into the air at different times of the day. The chart below shows the data you collected:

Time	Measured rate of soot production (kg/hour)
8:00	2
10:00	3
1:00	4
5:00	1

With the current data, you want to guess the rate of soot production at 3:00 pm. What assumption do you use to come up with that guess?

- A The pollution rate function is constant when there are no data points  
B The pollution rate function is linear between data points  
C The pollution rate should be identical the next day at the specific measured times  
D A and B

57. Find  $f(x) = x^2 + 3x - 3$  for  $x = 1$ .

- A 1
- B -5
- C 2
- D -1

58.  $f(x) = x^3 + x^2 + x$  and  $g(x) = x$ .

Find  $\frac{f(x)}{g(x)}$  as a simple expression.

- A  $x^2 + x + 1$
- B  $x + \frac{1}{x} + \frac{1}{x^2}$
- C  $x^4 + x^3 + x^2$
- D Cannot be simplified.

59. Find  $3A$  where  $A$  is the matrix  $\begin{bmatrix} 4 & 3 \\ 6 & 2 \end{bmatrix}$ .

A  $\begin{bmatrix} 4 & 8 \\ 12 & 16 \end{bmatrix}$

B  $\begin{bmatrix} 6 & 12 \\ 18 & 21 \end{bmatrix}$

C  $\begin{bmatrix} 12 & 9 \\ 18 & 6 \end{bmatrix}$

D  $\begin{bmatrix} \frac{2}{3} & \frac{4}{3} \\ 2 & \frac{8}{3} \end{bmatrix}$

60. An edge of a cube has a length of 1 cm.  
What is its volume?

- A  $1 \text{ cm}^3$
- B  $3 \text{ cm}^3$
- C  $6 \text{ cm}^3$
- D  $8 \text{ cm}^3$