



MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

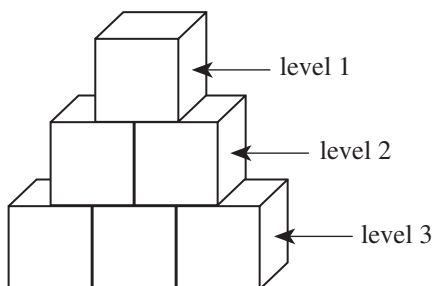
You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. Carmen is playing with blocks. She arranges stacks of blocks so that each successive level of blocks has 1 fewer block than the level below it and the top level has 1 block. Such a stack with 3 levels is shown below. Carmen wants to make such a stack with 12 levels. How many blocks would she use to build this stack?



- A. 66
B. 78
C. 132
D. 144
E. 156
2. To keep up with rising expenses, a motel manager needs to raise the \$40.00 room rate by 22%. What will be the new rate?
F. \$40.22
G. \$42.20
H. \$48.00
J. \$48.80
K. \$62.00
3. As a salesperson, your commission is directly proportional to the dollar amount of sales you make. If your sales are \$800, your commission is \$112. How much commission would you earn if you had \$1,400 in sales?
A. \$210
B. \$196
C. \$175
D. \$128
E. \$ 64

4. If $7 + 3x = 22$, then $2x = ?$

- F. 5
G. 10
H. 12
J. 14
K. $\frac{58}{3}$

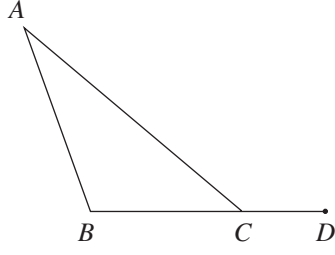
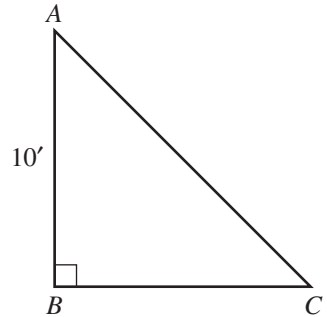
5. The total cost of renting a car is \$30.00 for each day the car is rented plus $28\frac{1}{2}\text{¢}$ for each mile the car is driven. What is the total cost of renting the car for 5 days and driving 350 miles?

(Note: No sales tax is involved.)

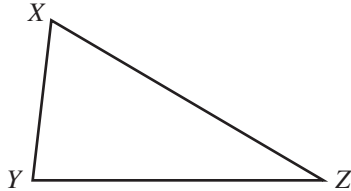
- A. \$ 104.75
B. \$ 159.98
C. \$ 249.75
D. \$ 300.00
E. \$1,147.50

6. In any parallelogram $ABCD$, it is always true that the measures of $\angle ABC$ and $\angle BCD$:
F. add up to 180° .
G. add up to 90° .
H. are each greater than 90° .
J. are each 90° .
K. are each less than 90° .



7. What is the least common denominator for adding the fractions $\frac{4}{15}$, $\frac{1}{12}$, and $\frac{3}{8}$?
- A. 40
B. 120
C. 180
D. 480
E. 1,440
8. The product $(2x^4y)(3x^5y^8)$ is equivalent to:
- F. $5x^9y^9$
G. $6x^9y^8$
H. $6x^9y^9$
J. $5x^{20}y^8$
K. $6x^{20}y^8$
9. It costs a dollars for an adult ticket to a reggae concert and s dollars for a student ticket. The difference between the cost of 12 adult tickets and 18 student tickets is \$36. Which of the following equations represents this relationship between a and s ?
- A. $\frac{12a}{18s} = 36$
B. $216as = 36$
C. $|12a - 18s| = 36$
D. $|12a + 18s| = 36$
E. $|18a + 12s| = 36$
10. If $x > 1$, then which of the following has the LEAST value?
- F. \sqrt{x}
G. $\sqrt{2x}$
H. $\sqrt{x \cdot x}$
J. $x\sqrt{x}$
K. $x \cdot x$
11. Charles defined a new operation, \blacklozenge , on pairs of ordered pairs of integers as follows: $(a,b) \blacklozenge (c,d) = \frac{ac + bd}{ab - cd}$. What is the value of $(2,1) \blacklozenge (3,4)$?
- A. -2
B. -1
C. 2
D. 5
E. 10
12. In the figure below, $\angle BAC$ measures 30° , $\angle ABC$ measures 110° , and points B , C , and D are collinear. What is the measure of $\angle ACD$?
- 
- F. 150°
G. 140°
H. 130°
J. 120°
K. 110°
13. In the isosceles right triangle below, $AB = 10$ feet. What is the length, in feet, of \overline{AC} ?
- 
- A. 5
B. 10
C. 20
D. $\sqrt{20}$
E. $10\sqrt{2}$
14. In a bag of 400 jelly beans, 25% of the jelly beans are red in color. If you randomly pick a jelly bean from the bag, what is the probability that the jelly bean picked is NOT one of the red jelly beans?
- F. $\frac{1}{2}$
G. $\frac{1}{4}$
H. $\frac{3}{4}$
J. $\frac{1}{16}$
K. $\frac{15}{16}$



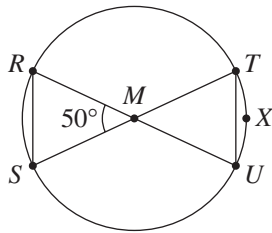
15. What polynomial must be added to $x^2 - 2x + 6$ so that the sum is $3x^2 + 7x$?
- A. $4x^2 + 5x + 6$
 B. $3x^2 + 9x + 6$
 C. $3x^2 + 9x - 6$
 D. $2x^2 + 9x - 6$
 E. $2x^2 - 5x + 6$
16. What is the slope of any line parallel to the line $8x + 9y = 3$ in the standard (x,y) coordinate plane?
- F. -8
 G. $-\frac{8}{9}$
 H. $\frac{8}{3}$
 J. 3
 K. 8
17. In the standard (x,y) coordinate plane, a line segment has its endpoints at $(3,6)$ and $(9,4)$. What are the coordinates of the midpoint of the line segment?
- A. $(3,-1)$
 B. $(3, 1)$
 C. $(6, 2)$
 D. $(6, 5)$
 E. $(12,10)$
18. When $y = x^2$, which of the following expressions is equivalent to $-y$?
- F. $(-x)^2$
 G. $-x^2$
 H. $-x$
 J. x^{-2}
 K. x
19. For the function $h(x) = 4x^2 - 5x$, what is the value of $h(-3)$?
- A. -93
 B. -9
 C. 21
 D. 51
 E. 159
20. For all triangles $\triangle XYZ$ where side \overline{XZ} is longer than side \overline{YZ} , such as the triangle shown below, which of the following statements is true?
- 
- F. The measure of $\angle X$ is always less than the measure of $\angle Y$.
 G. The measure of $\angle X$ is always equal to the measure of $\angle Y$.
 H. The measure of $\angle X$ is always greater than the measure of $\angle Y$.
 J. The measure of $\angle X$ is sometimes less than the measure of $\angle Y$ and sometimes equal to the measure of $\angle Y$.
 K. The measure of $\angle X$ is sometimes greater than the measure of $\angle Y$ and sometimes equal to the measure of $\angle Y$.
21. $|7(-3) + 2(4)| = ?$
- A. -28
 B. -13
 C. 13
 D. 28
 E. 29
22. If $x > |y|$, which of the following is the solution statement for x when $y = -4$?
- F. x is any real number.
 G. $x > 4$
 H. $x < 4$
 J. $-4 < x < 4$
 K. $x > 4$ or $x < -4$
23. The perimeter of a parallelogram is 72 inches, and 1 side measures 12 inches. What are the lengths, in inches, of the other 3 sides?
- A. 12, 12, 36
 B. 12, 18, 18
 C. 12, 24, 24
 D. 12, 30, 30
 E. Cannot be determined from the given information
24. The lengths of the corresponding sides of 2 similar right triangles are in the ratio of 2:5. If the hypotenuse of the smaller triangle is 5 inches long, how many inches long is the hypotenuse of the larger triangle?
- F. 2
 G. 2.5
 H. 7
 J. 10
 K. 12.5



25. The sides of a square are 3 cm long. One vertex of the square is at (3,0) on a square coordinate grid marked in centimeter units. Which of the following points could also be a vertex of the square?

A. (6, 0)
 B. $(4\frac{1}{2}, 1\frac{1}{2})$
 C. (1, 2)
 D. (0, -2)
 E. (-3, 0)

26. In the circle shown below, M is the center and lies on \overline{RU} and \overline{ST} . Which of the following statements is NOT true?



- F. $\angle TUM$ measures 65°
 G. \overline{TU} is parallel to \overline{RS}
 H. \widehat{TXU} measures 50°
 J. $\overline{RM} \cong \overline{TM}$
 K. $\overline{RS} \cong \overline{SM}$
27. John Jones has decided to go into the business of producing and selling boats. In order to begin this venture, he must invest \$10 million in a boat production plant. The cost to produce each boat will be \$7,000, and the selling price will be \$20,000. Accounting for the cost of the production plant, which of the following expressions represents the profit, in dollars, that John will realize when x boats are produced and sold?

A. $13,000x - 10,000,000$
 B. $27,000x - 10,000,000$
 C. $9,973,000x$
 D. $20,000x$
 E. $13,000x$

28. If $2x^2 + 6x = 36$, what are the possible values of x ?

F. -12 and 3
 G. -6 and 3
 H. -3 and 6
 J. -3 and 12
 K. 12 and 15

29. As a class experiment, a cart was rolled at a constant rate along a straight line. Shawn recorded in the chart below the cart's distance (x), in feet, from a reference point at the start of the experiment and for each of 5 times (t), in seconds.

t	0	1	2	3	4	5
x	10	14	18	22	26	30

Which of the following equations represents this data?

A. $x = t + 10$
 B. $x = 4t + 6$
 C. $x = 4t + 10$
 D. $x = 10t + 4$
 E. $x = 14t$

30. To increase the mean of 4 numbers by 2, by how much would the sum of the 4 numbers have to increase?

F. 2
 G. 4
 H. 6
 J. 8
 K. 16

31. Meg pounded a stake into the ground. When she attached a leash to both the stake and her dog's collar, the dog could reach 9 feet from the stake in any direction. Using 3.14 for π , what is the approximate area of the lawn, in square feet, the dog could reach from the stake?

A. 28
 B. 57
 C. 113
 D. 254
 E. 283

32. Television screen sizes are the diagonal length of the rectangular screen. Hector recently changed from watching a television with a 13-inch screen to a television with a similar 19-inch screen. If a boxcar appeared 8 inches long on the 13-inch screen, how long, to the nearest inch, will it appear on the 19-inch screen?

F. 10
 G. 12
 H. 14
 J. 16
 K. 18