A scientific, non-graphing calculator is required for this test.

The following formulas may be used on this test:

- Circumference of a circle: \( C = \pi d \) or \( C = 2\pi r \)
- Area of a circle: \( A = \pi r^2 \)
- Area of a triangle: \( A = \frac{1}{2}bh \)
- Pythagorean theorem: \( a^2 + b^2 = c^2 \)
  
  \( a \) and \( b \) are legs of a right triangle; \( c \) is the hypotenuse

- Simple interest: \( I = Prt \)
  
  \( t \) is in years

- Slope of a line through points \( (x_1, y_1) \) and \( (x_2, y_2) \): \( m = \frac{y_2 - y_1}{x_2 - x_1} \)

Answers may be found on the last page of this test.
1. Evaluate $7 - 3 (8 - 2)$
   a. $-19$  b. $-15$  c. $30$  
   d. $25$  e. $-11$  
   **Order of operations**

2. Three-fifths of seven-sixths is:
   a. $18/35$  b. $53/30$  c. $7/10$  
   d. $35/18$  e. none of these  
   **Arithmetic concepts using fractions, mixed numbers**

3. A rectangle is $\frac{5}{9}$ yd. wide and $1 \frac{7}{12}$ yd. long. Find the perimeter (in yards) around the rectangle.
   a. $4 \frac{5}{18}$ yards  b. $1 \frac{12}{21}$ yards  c. $2 \frac{5}{36}$ yards  
   d. $3 \frac{9}{16}$ yards  e. none of these  
   **Application of fraction, mixed number arithmetic**

4. $\frac{5}{8} \div \frac{21}{40} = $  a. $\frac{21}{25}$  b. $\frac{21}{64}$  c. $21$  
   d. $\frac{1}{21}$  e. $\frac{25}{21}$  
   **Simplify complex fraction**

5. The STRIP CARPET CO. specializes in carpets for hallways in hotels, motels, etc. The price for a particular style is quoted at $14 per linear foot. How much will it cost to carpet a hallway that is 60 ft. long?
   a. $3360.00$  b. $373.33$  c. $124.44$  
   d. $840.00$  e. $2520.00$  
   **Application of whole number arithmetic**

6. Which represents the largest value?
   a. $|5|$  b. $|8|$  c. $|0|$  
   d. $|4 + 1|$  e. $|5 - 9|$  
   **Absolute value concept**
   **Order relationships**
7. Which of the following shows the correct order for the four numbers?

a. \( .43 > \frac{3}{7} > .39 > \frac{8}{21} \)  

b. \( .43 > .39 > \frac{8}{21} > \frac{3}{7} \)

c. \( \frac{3}{7} < .43 < .39 < \frac{8}{21} \)  

d. \( .43 > .39 > \frac{3}{7} > \frac{8}{21} \)  

e. none of these

8. The least common multiple of 20 and 45 is:

a. 5  
b. 900  
c. 450  
d. 180  
e. none of these

9. The prime factorization of 72 is:

a. \( 8 \cdot 9 \)  
b. \( 12 \cdot 6 \)  
c. \( 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \)  
d. \( 72 \cdot 1 \)  
e. none of these

10. \( 7^5 \) is equal to:

a. \( 7 \cdot 5 \)  
b. \( 7 + 7 + 7 + 7 + 7 \)  
c. \( \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} \)  
d. \( 7 \cdot 7 \cdot 7 \cdot 7 \)  
e. \( 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \)

11. \( 2^4 \) =

a. \(-16\)  
b. \(16\)  
c. \(8\)  
d. \(-8\)  

e. none of these

12. \( 2^0 \) is:

a. 0  
b. 1  
c. 2  
d. undefined  
e. none of these

13. \( 4^2 \) =

a. \(-16\)  
b. \(16\)  
c. \(\frac{1}{16}\)  
d. \(-8\)  

e. none of these

14. \( 16^{1/2} \) =

a. 4  
b. \(\frac{1}{4}\)  
c. 8  
d. \(\frac{1}{8}\)  

e. none of these
15. \( \sqrt[3]{x^4} \) is the same as:
   a. \( x^{3/4} \)  b. \( x^{4/3} \)  c. \( \frac{4x}{3} \)  d. \( 3x^4 \)  e. \( \frac{x^4}{3} \)
   Use exponent rules

16. The Library of Congress has approximately 59,000,000 volumes. Write this number in scientific notation.
   a. 59,000,000  b. 5.9 \( \times \) 10^6  c. 59 mil
   d. 5.9 \( \times \) 10^7  e. 5.9 \( \times \) 10^6
   Use scientific notation

17. \( \frac{x^{12}}{x^3} = \)
   a. \( x^4 \)  b. \( x^{15} \)  c. \( x^9 \)  d. \( x^6 \)
   Use exponent rules
   e. none of these

18. If \( x = 3 \), then \( 4x^2 = \)
   a. 64  b. 144  c. 24  d. 36
   e. none of these
   Evaluate polynomial expression for positive integer values of \( x \)

19. If \( x = -5 \), then \( 2x^2 - x + 1 = \)
   a. 56  b. 106  c. 46  d. 96
   e. none of these
   Evaluate polynomial for integer values of \( x \)

20. \((3x^4)(7x^2) = \)
   a. 21\( x^{16} \)  b. 21\( x^8 \)  c. 10\( x^8 \)  d. 10\( x^6 \)  e. 21\( x^6 \)
   Operations on polynomials

21. \((5x^2 - 2xy + 3y^2) + (4x^2 + xy - 3y^2) = \)
   a. \( x^2 \cdot xy \)  b. \( x^2 \cdot xy + y^2 \)  c. \( x^2 \cdot 2 \)
   d. 9\( x^2 \cdot xy \)  e. none of these
   Operations on polynomials

22. \((5x^2 - 2xy + 3y^2) - (4x^2 + xy - 3y^2) = \)
   a. \( 9x^2 \cdot xy \)  b. \( 9x^2 \cdot xy + 6y^2 \)  c. \( 9x^2 \cdot 3xy \)
   d. \( 9x^2 \cdot 3xy + 6y^2 \)  e. none of these
   Operations on polynomials
23. \((3x + 5)(x - 4) = \)
   a. \(3x^2 \div 20\)   b. \(3x^2 + 7x \div 20\)   c. \(3x^2 \div 7x \div 20\)
   d. \(3x^2 \div 7x + 20\)   e. none of these

24. The greatest common monomial factor of the polynomial \(12a^2 b^2 + 18ab^3 \div 24a^3 b^2\) is:
   a. \(12ab\)   b. \(6a^2 b^2\)   c. \(24a^3 b^3\)   d. \(6ab\)
   e. none of these

25. Simplify \(\frac{12x^3 y^7}{4xy^2}\)
   a. \(-3 \frac{x^3 y^7}{xy^2}\)   b. \[8x^2 y^5\]   c. \(3x^3 y^{7/2}\)   d. \[3x^2 y^5\]
   e. none of these

26. Multiply \(3x^2 y(4xy \div 2y^3 \div 5x^4 y^2)\)
   a. \(12x^2 y \div 6x^2 y^3 \div 15x^6 y^2\)   b. \(7x^3 y^2 \div x^2 y^4 \div 2x^6 y^3\)
   c. \(12x^3 y^2 \div 6x^2 y^4 \div 15x^6 y^3\)   d. \(12x^3 y^2 \div 2y^3 \div 5x^4 y^2\)
   e. none of these

27. One factor of \(x^2 \div 5x \div 24\) is:
   a. \(x - 4\)   b. \(x - 8\)   c. \(x + 6\)   d. \(x - 3\)
   e. can't be factored

28. In a triangle, the sum of the angles is 180°. If the three angles are represented by \(x\), \(3x - 10\), and \(2(x + 14)\), find the measure of angle \(x\).
   a. \(27°\)   b. \(35°\)   c. \(52°\)   d. \(29°\)
   e. not enough information is given

29. The formula to change from Fahrenheit to Celsius temperature is: \(C = \frac{5}{9}(F \div 32)\). If the Fahrenheit temperature is 77°, what is the equivalent Celsius temperature? (to the nearest degree)
   a. \(81°\)   b. \(49°\)   c. \(25°\)   d. \(11°\)   e. none of these
30. A number decreased by 5 is equal to –4. Find the number.
   a. 9   b. 1   c. –1   d. –9   e. none of these

31. Solve for x: \( \frac{17}{8} x + 2 = 4 \)
   a. \(-\frac{48}{7}\)   b. \(\frac{23}{8}\)   c. \(\frac{16}{7}\)   d. \(-\frac{16}{7}\)   e. 15

32. The solution for \(-3x < 4\) is:
   a. \(x < 1\)   b. \(x < 7\)   c. \(x < \frac{-4}{3}\)
   d. \(x > \frac{-3}{4}\)   e. \(x > \frac{-4}{3}\)

33. Write in symbols, using \(n\) for the unknown number:
   “Five more than twice a number is less than one.”
   a. \(5 > 2n < 1\)   b. \(2n + 5 < 1\)   c. \((2n)(5) = 1\)
   d. \(5 + 2n - 1\)   e. none of these

34. The number line solution for the inequality \(2x + 5 > 1\) is:
   a. \[\begin{array}{c}
   \text{a. } & \text{b. } & \text{c. } & \text{d. } & \text{e. }\\
   \hline
   3 & 4 & 5 & 6 & 7
   \end{array}\]

35. \(A = kB\) where \(k > 0\). If \(B\) increases, \(A\) will:
   a. increase   b. decrease   c. stay the same
   d. can’t tell without knowing the values of \(A\) and \(B\)

36. The scale on a map is 2 inches to 25 miles. How far apart are two towns that are \(3\frac{1}{2}\) inches apart on the map?
   a. \(87\frac{1}{2}\) mi.   b. \(43\frac{3}{4}\) mi.   c. \(137\frac{1}{2}\) mi.
   d. 50 miles   e. none of these
37. In a city with a population of 12,000, a recent market survey revealed that 8 of every 200 people will purchase a new brand of soap. What percent of the population will purchase this new soap?
   a. 25%  b. 8%  c. 4%  d. 7.5%  e. 13\frac{1}{3}%

38. If \( \frac{3}{t} = \frac{4}{5} \) then \( t = ? \)
   a. \( \frac{12}{5} \)  b. \( \frac{14}{5} \)  c. \( \frac{15}{4} \)  d. \( \frac{11}{5} \)  e. \( \frac{15}{4} \)

39. If you can invest $7500 in a Certificate of Deposit paying \( 5\frac{3}{4}\% \) per year simple interest, how much interest (in dollars) will you have earned after 3 years?
   a. $8793.75  b. $1201.50  c. $431.25  d. $1293.75  e. $7931.25

40. A salesperson earns a weekly base salary of $210. She also earns a 6% commission on her total dollar volume of sales for the week. What is the dollar volume of sales in a week where she made a total of $450?
   a. $5,670  b. $2,370  c. $4,000  d. $11,000  e. none of these

41. The danger area surrounding a "spill" of radioactive material covers a circular region. The radiation from this material is dangerous for a distance of 2.3 km from the center. What is the total area affected by the radioactive material?
   a. 10.58\( \square \) km\(^2\)  b. 9.2\( \square \) km\(^2\)  c. 5.29\( \square \) km\(^2\)
   d. 2.3\( \square \) km  e. 4.6\( \square \) km

42. The length of a rectangle is 8 meters more than twice its width. If the rectangle has a perimeter of 94 meters, what is the length of the rectangle?
   a. 13 meters  b. 27 meters  c. 42 meters
   d. 34 meters  e. none of these

43. A parking lot is in the shape of a rectangle with a width of 200 feet and length of 450 feet. How far would you walk from one corner of the parking lot diagonally across to the opposite corner? (to the nearest foot)
   a. 500 ft.  b. 492 ft.  c. 650 ft.  d. 403 ft.  e. none of these
44. When the system of equations \[
\begin{align*}
2x + y &= 6 \\
3x - 2y &= 16
\end{align*}
\] is solved, the value of \(x\) is:

   a. 4   b. 2   c. –2   d. 3   e. –3

45. The solution set for the equation \(x^2 - 9x = 0\) is

   a. \{3\}   b. \{9\}   c. \{3, –3\}   d. \{0, 9\}   e. \{9, –9\}

46. The solution set for the equation \(x^2 = 6x + 16\) is

   a. \{8\}   b. \{8, –2\}   c. \{2, –6\}   d. \{0\}   e. \{4, –4\}

47. The point \((-3, 4)\) could be located at point

   a. A   b. B   c. C   d. D   e. none of these

48. The slope of the line between the points \((2, –1)\) and \((4, 5)\) is:

   a. –2   b. 2   c. –3   d. 3   e. \(2/3\)

49. The slope of the line in the accompanying graph is:

   a. positive   b. negative   c. undefined   d. zero   e. not enough information is given
50. Which is closest to the slope of the line shown below?

   a. 3  b. –3  c. 1/3  d. 0  e. –1/3

![Graph of a line](image)

51. Expressed in slope-intercept form, the equation of the line $3x - y = 10$ is:

   a. $y = 3x + 10$  b. $y = 3x - 10$  c. $3x - y = 10$
   d. $y = \frac{10}{3}x$  e. none of these

52. The line shown is the graph of the equation:

   a. $y = 3x + 2$
   b. $y = \frac{2}{3}x + 2$
   c. $y = 2x + 3$
   d. $y = \frac{3}{2}x + 3$
   e. $y = \frac{2}{3}x + 2$

53. If $f(x) = 4x - x^2$ then $f(-1) =$ ?

   a. 5  b. –5  c. 3  d. –3
   e. none of these

54. Which of the following graphs shows a function $f(x)$?

   a. ![Graph 1](image)
   b. ![Graph 2](image)
   c. ![Graph 3](image)
   d. ![Graph 4](image)
   e. none of these
55. In the graph of function $y = f(x)$ shown below, $f(2)$ is:
   a. 0  b. 1  c. 2  d. 3  e. not defined

![Graph of function $y = f(x)$]

Identify function value from a graph

56. The graph of the function $y = x^2 + 3x + 4$ is
   a. a parabola that opens upward  b. a parabola that opens downward
   c. a line with positive slope  d. a line with negative slope
   e. none of these

Analyze a function

57. The function $y = x^2 + 3x + 4$ has a y-intercept at the point
   a. $(0, 3)$  b. $(0, -1)$  c. $(0, -4)$  d. $(0, 1)$  e. $(0, 4)$

Analyze a function

58. The accompanying bar graph gives data on one hundred families surveyed as to the number of children in the family. Which of the following is true according to the bar graph?
   a. More families had 1 child than had 3 children.
   b. About 15 families had 4 children.
   c. Over half of the total number of families had 2 children.
   d. About one-fourth of the total number of families had 3 children.
   e. The graph does not give sufficient information to make any of these conclusions.

Interpret charts, bar graphs, circle graphs, line graphs, picture graphs

![Bar graph showing number of families by number of children]
59. The accompanying circle graph shows percentages of recycled materials at Smallville Recycling Center. If the total tonnage of recycled material was 4000 tons, how many tons of paper were recycled?

- a. 37 tons
- b. 1480 tons
- c. 3700 tons
- d. 63 tons
- e. none of these

![Circle Graph]

60. Stacy Best owns a weight loss clinic. She charges her clients a one-time membership fee. She also charges per pound of weight lost. Therefore, the successful she is at helping clients lose weight, the more income she will receive. The following graph shows a client’s cost for losing weight.

![Graph]

A client who was charged $150 lost about how many pounds?

- a. 0 pounds
- b. 25 pounds
- c. 40 pounds
- d. 10 pounds
- e. 75 pounds
ANSWER KEY--SAMPLE TEST

1. E
2. C
3. A
4. E
5. D
6. B
7. A
8. D
9. C
10. D
11. A
12. B
13. C
14. A
15. B
16. D
17. C
18. D
19. A
20. E
21. A
22. D
23. C
24. E
25. D
26. C
27. B
28. A
29. C
30. B
31. D
32. E
33. B
34. D
35. A
36. B
37. C
38. C
39. D
40. C
41. C
42. D
43. B
44. A
45. D
46. B
47. A
48. D
49. B
50. C
51. B
52. E
53. B
54. B
55. D
56. B
57. E
58. D
59. B
60. B