

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

Junior High School Mathematics Competition

EIGHTH GRADE TEST

1975

SCORING FORMULA: 4R-W

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DIRECTIONS:

This is a test of your competence in Junior High School Mathematics. For each problem there are 5 possible answers listed. You are to work the problems, determine the correct answer, and indicate your choice on the separate answer sheet provided you.

SAMPLE:

1. If $X + 1 = 2$, then X equals:

- A. 0
- B. 2
- C. -1
- D. 1
- E. None of the above.

- 1 (a) (b) (c) (d) (e)
- 2 (a) (b) (c) (d) (e)
- 3 (a) (b) (c) (d) (e)
- 4 (a) (b) (c) (d) (e)
- 5 (a) (b) (c) (d) (e)

The correct answer is 1, which is answer (D) so you would answer this problem by darkening the space on the answer sheet corresponding with this choice.

If you should change your mind about an answer, be sure to erase completely. Avoid wild guessing as wrong answers count against you. Do not mark more than one answer for any problem. Make no stray marks of any kind on your answer sheet.

When told to do so, open your test booklet to page 2 and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

1. If the measure of two sides of a right triangle are 12 and 4, the measure of the hypotenuse is
 - A. 16
 - B. 4
 - C. $\sqrt{160}$
 - D. $\sqrt{48}$
 - E. 48

2. The Euclidean algorithm is a method which is used to
 - A. trisect an angle, using a straightedge and compass.
 - B. find the greatest common divisor of two numbers.
 - C. inscribe a rectangle in a circle.
 - D. find the least common multiple of two numbers.
 - E. find a triangle whose area is equal to the area of a given circle.

3. The least common multiple of the numbers 30, 12 and 15 is
 - A. 60
 - B. 72
 - C. 5400
 - D. 180
 - E. 450

4. If $X = \{2, 4, 6, 8\}$ and $Y = \{3, 6, 9, 12\}$, then
 - A. $X \cap Y = \{2, 3, 4, 6, 8, 9, 12\}$.
 - B. $X \cup Y = \{6\}$.
 - C. $X \cup Y = \{2, 3, 4, 6, 8, 9, 12\}$.
 - D. $X \cap Y = \{2, 3\}$.
 - E. None of the above.

5. Allen made a triangular pennant with sides of 35 inches, 18 inches, and 37 inches. What is the perimeter of the pennant in feet?
 - A. 8 feet
 - B. 9 feet
 - C. 7.2 feet
 - D. 6.5 feet
 - E. None of the above.

6. $4^3 + \sqrt[3]{8} =$
- A. 12
 - B. 32
 - C. 66
 - D. 18
 - E. None of the above.
7. Which one of the following is not true?
- A. A meter has greater length than a yard.
 - B. A kilometer has greater length than a mile.
 - C. An inch has greater length than a centimeter.
 - D. A kilogram is heavier than a pound.
 - E. 25°C is warmer than 60°F .
8. $-\frac{3}{8} + \frac{5}{9} =$
- A. $\frac{2}{17}$
 - B. $\frac{13}{72}$
 - C. $-\frac{15}{72}$
 - D. $\frac{67}{72}$
 - E. $-\frac{67}{72}$
9. Which of the following is written in scientific notation?
- A. 37.8×10
 - B. 3.78×10
 - C. 378
 - D. 37.8×10^3
 - E. 0.378×10^2
10. The base-ten value of the base-two numeral $10101101_{(2)}$ is
- A. 10101101
 - B. 301
 - C. 173
 - D. 213
 - E. 169

11. The solution set of $A = \{x \mid 6 < x < 10\}$ in the set of integers is
- A. $\{7, 8, 9\}$
 - B. $\{6, 7, 8, 9, 10\}$
 - C. $\{6, 7, 8, 9\}$
 - D. $\{7, 8, 9, 10\}$
 - E. None of the above.
12. In clock arithmetic, or arithmetic modulo eight, the product of 6 and 7 is
- A. 24
 - B. 6
 - C. 5
 - D. 42
 - E. 2
13. Three consecutive vertices of a parallelogram ABCD have coordinates given by A(1, 1), B(8, 2), and C(12, 6) respectively. The coordinates of D are
- A. (19, 7)
 - B. (5, 5)
 - C. (-2, -3)
 - D. (5, 4)
 - E. (-3, -2)
14. Two rectangles are similar with the sides of the larger being four times the length of the sides of the smaller. The smaller rectangle has sides that measure 5 inches and 8 inches. The area of the larger rectangular region is
- A. 160 square inches.
 - B. 640 square inches.
 - C. 40 square inches.
 - D. 10 square inches.
 - E. Not enough information given.
15. A 4-oz. bottle of perfume sells for \$4.80. However, 8-oz. bottles are a better buy in that the cost per ounce is only 60% of the cost per ounce for a 4-oz. bottle. How much does an 8-oz. bottle cost?
- A. \$9.60
 - B. \$5.76
 - C. \$6.20
 - D. \$6.24
 - E. \$2.88

16. Between what powers of 10 is the number 0.000035?

- A. $10^3, 10^4$
- B. $10^{-4}, 10^{-5}$
- C. $10^{-3}, 10^{-4}$
- D. $10^{-5}, 10^{-6}$
- E. $10^4, 10^5$

17. If $\frac{7-x}{2x} = \frac{1}{2}$, then the value of x is

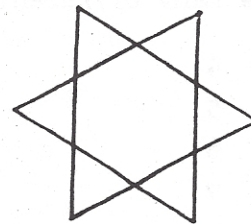
- A. 3
- B. $\frac{5}{2}$
- C. 4
- D. 5
- E. $\frac{7}{2}$

18. Find the median of the numbers 1, 2, 3, 4, 4, 5, 7, 7, 7, 9.

- A. 7
- B. 4
- C. 5
- D. $4\frac{1}{2}$
- E. 4.9

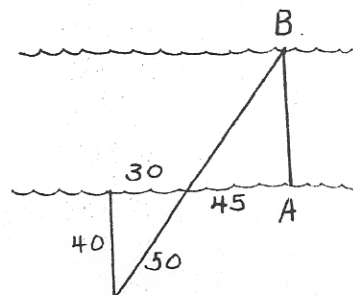
19. How many lines of symmetry does the figure below have?

- A. 0
- B. 1
- C. 2
- D. 4
- E. More than 4.



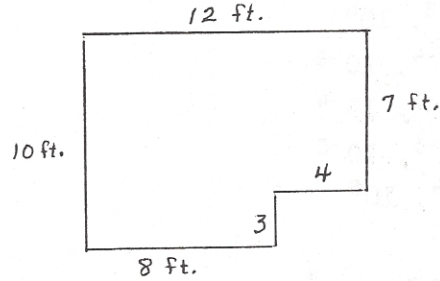
20. John laid out the right triangles shown in the figure below to measure the distance AB across the river. How far is it across?

- A. 40
- B. 75
- C. 50
- D. 90
- E. 60



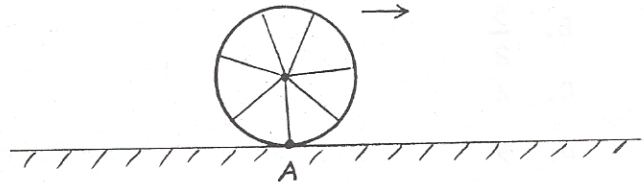
21. How much would it cost to buy carpet for the room pictured below if the carpet costs \$8.95 per square yard. Assume no material is wasted.

- A. \$966.60
- B. \$208.00
- C. 107.40
- D. \$322.20
- E. None of the above.



22. A bicycle wheel whose radius is 10 inches has a yellow dot painted on the edge of the wheel at point A. If the wheel is rolled to the right 5 complete revolutions, how far to the right of A will the yellow dot be?

- A. 100 inches
- B. 100π inches
- C. $10\pi^2$ inches
- D. $50\pi^2$ inches
- E. 500π inches

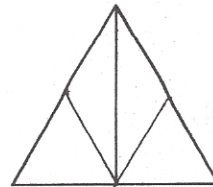


23. A number is perfect if the sum of its proper divisors equals the number. For instance 6 is perfect since $1 + 2 + 3 = 6$. Which of the following is a perfect number?

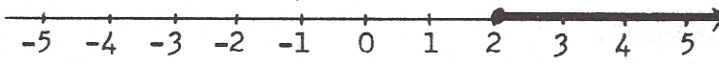
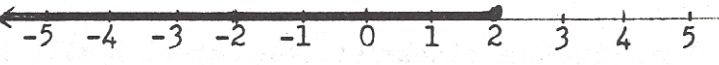
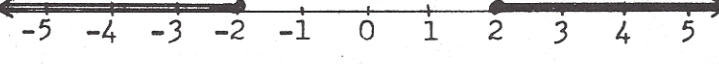
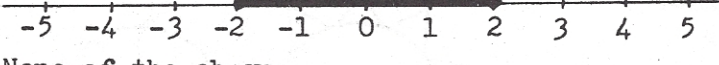
- A. 10
- B. 16
- C. 24
- D. 28
- E. None of the above.

24. How many different triangles are in the figure below?

- A. 4
- B. 5
- C. 6
- D. 7
- E. None of the above.



25. Which graph below represents the inequality $3x - 4 \geq 4 - x$ where x represents a real number?

- A. 
- B. 
- C. 
- D. 
- E. None of the above.

26. A piece of plywood is in the shape of a parallelogram. The length of the altitude of the piece is 18 inches. The length of the base is 6 feet. What is the area of the piece in square feet?

- A. 108
B. 1152
C. 9
D. 54
E. 576

27. The chorus at Ford High School will sing 4 songs at the spring concert. In how many ways can the titles of the four songs be listed on the program?

- A. 4
B. An infinite number
C. 12
D. 24
E. 256

28. In the numeral 3534 the 3 that is underlined stands for how many times the other 3?

- A. 10
B. 100
C. 1000
D. The same
E. None of the above.

29. Of the following statements which one is false?

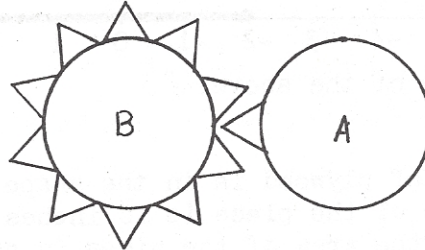
- A. Some prime numbers are even.
B. The units digit of a prime number may be 5.
C. 51 is a prime number.
D. The units digit of a prime number may be a 3.
E. 47 is a prime number.

30. Which of the following is not true?

- A. A square is a rectangle.
- B. A rectangle is a polygon.
- C. A triangle is a polygon.
- D. A trapezoid is a quadrilateral.
- E. A quadrilateral is a rectangle.

31. If wheel A turns through 3000 revolutions clockwise, then wheel B will turn through

- A. 3000 revolutions clockwise.
- B. 3000 revolutions counter clockwise.
- C. 30 revolutions clockwise.
- D. 30 revolutions counter clockwise.
- E. 300 revolutions counter clockwise.



32. Which of the following statements concerning the empty set and its representations, \emptyset and $\{ \}$, is false?

- A. $\emptyset \subseteq \{\emptyset\}$
- B. $\{ \} \subseteq \emptyset$
- C. $\emptyset \in \{\emptyset\}$
- D. $\{\emptyset\} \subseteq \{\{\emptyset\}\}$
- E. $\{\emptyset\} \in \{\{\emptyset\}\}$

33. The solution set for the equation $|4 - b| = 2$ is

- A. $\{2, 6\}$
- B. $\{2, 4\}$
- C. $\{4\}$
- D. $\{2\}$
- E. None of the above.

34. Which of the following open sentences has no solution set in the system of integers?

- A. $2n + 6 = 2$
- B. $\frac{n}{2} - \frac{3}{2} = 0$
- C. $2n + 1 = 1$
- D. $2n + 1 = 4$
- E. $n + n = 2n$

35. Give the next three numbers in the following sequence of numbers:
1, 1, 2, 3, 5, 8, 13, 21, 34 - - -

- A. 47, 62, 79
- B. 55, 88, 143
- C. 52, 66, 118
- D. 57, 91, 148
- E. 55, 89, 144

36. The sum of the natural numbers between 50 and 151 is $51 + 52 + 53 + \dots + 150$. Find the value of this sum. (Hint: consider the sum of the first and the last, the second and the next to last, etc.)

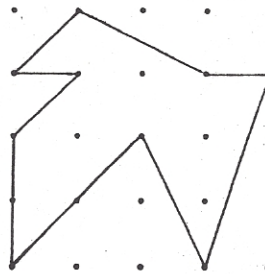
- A. 10,050
- B. 11,050
- C. 11,000
- D. 10,000
- E. 9,950

37. If $a * b$ means $a^2 - b$, the value of $\frac{1}{2} * \frac{1}{2}$ is

- A. 0
- B. $\frac{1}{4}$
- C. $-\frac{1}{4}$
- D. $\frac{1}{2}$
- E. $-\frac{1}{2}$

38. Let 1 designate the area of the region of the smallest square that can be formed on a pinboard (Geoboard) having vertices at pins of the board. What is the area of the enclosed region?

- A. 8
- B. $8\frac{1}{2}$
- C. 9
- D. $9\frac{1}{2}$
- E. None of the above.



39. Which of the following cannot be formed by fitting together (edge to edge) two or more $30^\circ - 60^\circ - 90^\circ$ triangular regions?

- A. Right angled triangle
- B. Equilateral triangle
- C. Isosceles triangle that is not equilateral
- D. Square
- E. All of the above

40. If 4 red socks and 4 white socks of the same size are in a drawer and if two socks are drawn out without looking at them, what is the probability that they will be a pair of the same color?

- A. $\frac{1}{2}$
- B. $\frac{2}{3}$
- C. $\frac{3}{7}$
- D. $\frac{1}{16}$

- E. None of the above

