

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

Junior High School Mathematics Competition

SEVENTH GRADE TEST

1985

SCORING FORMULA: $4R - W + 40$

Prepared by:

The Dept. of Mathematics and Computer Science
Austin Peay State University.

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. $(-6) - (-8) =$
 - a. -14
 - b. 14
 - c. 2
 - d. -2
 - e. none of these

2. Which of the following is not a polygon?
 - a. a square
 - b. a rectangle
 - c. a hexagon
 - d. a circle
 - e. a triangle

3. Which of the following numbers is written in scientific notation?
 - a. 16.824×10^{-3}
 - b. 2.304×10^2
 - c. 254×10^6
 - d. 0.21×10^{-4}
 - e. 16×10^1

4. $2(a + b) = 2(b + a)$ is an example of the
 - a. commutative property of addition
 - b. distributive property
 - c. commutative property of multiplication
 - d. associative property of addition
 - e. additive identity

5. Which of the following numbers is not divisible by 4?
- a. 457,372
 - b. 379,888
 - c. 981,656
 - d. 873,512
 - e. 437,962
6. Candy is on sale for \$5.00 for 2 pounds. At this rate, how much should a 5 pound bag cost?
- a. \$10.00
 - b. \$10.50
 - c. \$11.50
 - d. \$12.00
 - e. \$12.50
7. A living room measures 13 feet by 24 feet. A rug which measures 12 feet by 18 feet is placed on the floor. What is the area of the uncovered portion of the room?
- a. 96 square feet
 - b. 528 square feet
 - c. 312 square feet
 - d. 216 square feet
 - e. 104 square feet
8. What would the total bill be for an \$80.00 coat if the sales tax is $7\frac{3}{4}\%$?
- a. \$80.00
 - b. \$86.20
 - c. \$86.00
 - d. \$87.75
 - e. \$88.00

9. Which of the following is the prime factorization of 480?
- a. $2^4 \cdot 3 \cdot 5$
 - b. $2^5 \cdot 15$
 - c. $2^5 \cdot 3 \cdot 7$
 - d. $2^4 \cdot 6 \cdot 5$
 - e. $2^5 \cdot 3 \cdot 5$
10. The lowest temperature ever recorded in Nashville is -17° F. How many degrees was this below freezing?
- a. 17
 - b. 15
 - c. 32
 - d. -17
 - e. 49
11. A student enters a number in a calculator. He intends to multiply by 10 but instead of pressing the multiplication key he presses the division key. The number which appears on the calculator display is 1.763. What number would be on the display if he had pressed the multiplication key?
- a. .01763
 - b. .1763
 - c. 17.63
 - d. 176.3
 - e. 1763
12. Find the width of a rectangle whose length is $5\frac{1}{3}$ cm and whose perimeter is 19 cm.
- a. $13\frac{2}{3}$ cm
 - b. $8\frac{1}{3}$ cm
 - c. $6\frac{5}{6}$ cm
 - d. $2\frac{2}{3}$ cm
 - e. $4\frac{1}{6}$ cm

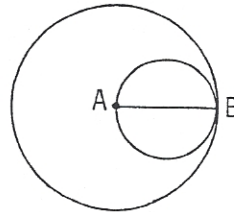
13. A basketball team won 4 of the 8 games already played. If it wins the next two games, what percent of the games will it then have won?
- a. 80%
 - b. 70%
 - c. 60%
 - d. 50%
 - e. 40%
14. $0.000035 \div 0.00000007 =$
- a. 500
 - b. 5,000
 - c. 0.0000000000245
 - d. 50,000
 - e. 0,002
15. The intersection of a circle and one of its tangents is a set of points with
- a. zero elements
 - b. one element
 - c. two elements
 - d. three elements
 - e. an infinite number of elements
16. The ancient Greeks classified a number as deficient if it exceeds the sum of its proper divisors. For instance, 8 is deficient because its proper divisors are 1, 2 and 4 and $1 + 2 + 4 = 7$. Which one of the following numbers is deficient?
- a. 12
 - b. 18
 - c. 15
 - d. 24
 - e. none of the above

17. A jug will hold $\frac{3}{4}$ gallon of punch. How much punch is in the jug if it is $\frac{2}{3}$ full?
- a. $\frac{5}{7}$ gallon
 - b. $\frac{1}{2}$ gallon
 - c. $\frac{1}{4}$ gallon
 - d. $\frac{2}{3}$ gallon
 - e. $\frac{1}{12}$ gallon
18. The total surface area of a cube with 2-inch sides is
- a. 8 square inches
 - b. 16 square inches
 - c. 4 square inches
 - d. 24 square inches
 - e. 32 square inches
19. A gas tank on a bus is $\frac{1}{3}$ full. If 14 gallons were added to the tank, it would be $\frac{5}{8}$ full. What is the capacity of the tank?
- a. 40 gallons
 - b. 45 gallons
 - c. 48 gallons
 - d. 51 gallons
 - e. 54 gallons
20. How many numbers greater than 6,000 can be formed from the digits 3, 5, 7 and 9 if each digit must be used exactly once in each number?
- a. 8
 - b. 9
 - c. 10
 - d. 12
 - e. 14

21. Cars A and B are 75 miles apart. Car A moves toward B at 40 MPH and B moves toward A at 60 MPH. How far has A moved when they meet?
- 35 miles
 - $27\frac{1}{2}$ miles
 - 45 miles
 - 30 miles
 - $47\frac{1}{2}$ miles

22. In the accompanying figure, \overline{AB} is a radius of the larger circle and \overline{AB} is a diameter of the smaller circle. What is the ratio of the area of the smaller circle to the area of the larger circle?

- $\frac{1}{5}$
- $\frac{1}{3}$
- $\frac{2}{9}$
- $\frac{1}{4}$
- $\frac{1}{\pi}$



23. A die is tossed twice. What is the probability that the product of the numbers on the top faces is 6?
- $\frac{5}{18}$
 - $\frac{1}{9}$
 - $\frac{1}{6}$
 - $\frac{1}{18}$
 - $\frac{11}{36}$
24. A man travels at a speed of 50 miles per hour for 8 hours and then at a speed of 60 miles per hour for 4 hours. What was his average speed for the entire trip.
- 52 miles per hour
 - $51\frac{1}{2}$ miles per hour
 - $53\frac{1}{3}$ miles per hour
 - 54 miles per hour
 - 55 miles per hour

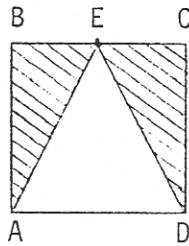
25. What is the area of an isosceles right triangle with a hypotenuse of length $\sqrt{8}$?
- a. $\sqrt{2}$
 - b. $2\sqrt{2}$
 - c. 4
 - d. $\frac{\sqrt{8}}{2}$
 - e. 2
26. A homework assignment is to read all the material on pages 6 through 21, 28 through 33, and 40 through 57. How many pages are assigned to be read?
- a. 37
 - b. 52
 - c. 38
 - d. 40
 - e. 51
27. A sweater was marked 60% off and then later discounted an additional 20% of the sales price. The price tag was then lost and the sweater was sold for \$10.00. The tag was later found and the sweater had been sold for \$1.20 less than the price on the tag. What was the original cost of the sweater?
- a. \$56.00
 - b. \$42.00
 - c. 93.33
 - d. \$31.25
 - e. \$35.00 -
28. $10 + 15 \div 5 + 8 - 4 \cdot 3$
- a. 9
 - b. 1
 - c. 17
 - d. 27
 - e. 25

29. $0.030303 \dots =$

- a. $\frac{3}{100}$
- b. $\frac{3}{40}$
- c. $\frac{3}{9}$
- d. $\frac{1}{33}$
- e. $\frac{1}{3}$

30. Quadrilateral ABCD is a square with $AB = 6$. What is the area of the shaded region?

- a. 18
- b. 20
- c. 22
- d. 24
- e. 30



31. One bell strikes every eight minutes and a second bell every 14 minutes. If both strike at 12:00 o'clock noon, when will they again strike together?

- a. 12:14 pm
- b. 12:32 pm
- c. 12:42 pm
- d. 12:56 pm
- e. 1:52 pm

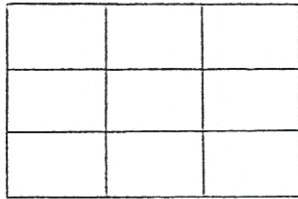
32. $1 - 2 + 3 - 4 + 5 - 6 + 7 - \dots + 99 - 100 =$

- a. 0
- b. -25
- c. -40
- d. -50
- e. -60

33. The larger of two cylindrical cans is $1\frac{1}{2}$ times as tall as the smaller can and has a circular base whose area is 4 times that of the smaller can. The ratio of the volume of the larger can to that of the smaller can is
- a. 3 to 1
 - b. 11 to 2
 - c. 6 to 1
 - d. 9 to 1
 - e. 24 to 1

34. How many rectangles are pictured below?

- a. 31
- b. 24
- c. 30
- d. 36
- e. 42

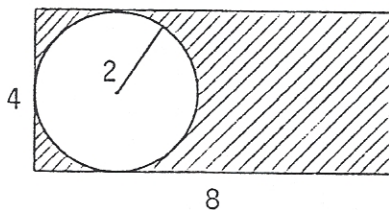


35. The population of city A is $\frac{1}{2}$ that of city B and the population of city B is 3 times that of city C. Forty percent of those in city A live in Henry County. If the number of people in city A who live in Henry County is 1200, how many people live in city C?
- a. 800
 - b. 2000
 - c. 3000
 - d. 1800
 - e. 18000

36. Which of the following natural numbers can be written as a sum of two squares of natural numbers in two distinct ways?
- a. 65
 - b. 25
 - c. 61
 - d. 68
 - e. 72

37. Find the area shaded in the figure below.

- a. $64 - 4\pi$
- b. $32 - 16\pi$
- c. $32 - 4\pi$
- d. $16\pi - 32$
- e. $16\pi - 16$



38. If the measure of the vertex angle of an isosceles triangle is between 40 and 70 degrees, then the measure in degrees of each of the two equal base angles must be between
- a. 45° and 60°
 - b. 55° and 70°
 - c. 65° and 80°
 - d. 70° and 110°
 - e. 110° and 140°
39. Two persons are selected at random from 3 doctors and 2 lawyers. What is the probability that both are of the same profession?
- a. $\frac{9}{10}$
 - b. $\frac{4}{5}$
 - c. $\frac{3}{5}$
 - d. $\frac{2}{5}$
 - e. $\frac{1}{10}$

40. The rational number x has the following properties:

(1) $x \in \left\{ \frac{3}{7}, \frac{4}{7}, \frac{3}{5}, \frac{23}{40}, \frac{9}{7} \right\}$

(2) $x > \frac{1}{2}$

(3) $x < 1$

(4) x has a nonterminating decimal name

Then $x =$

a. $\frac{3}{7}$

b. $\frac{4}{7}$

c. $\frac{3}{5}$

d. $\frac{23}{40}$

e. $\frac{9}{7}$