AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE. TENNESSEE 37040

JUNIOR HIGH/MIDDLE SCHOOL
MATHEMATICS COMPETITION

Prepared by:

SEVENTH GRADE TEST
1992
SCORING FORMULA: 4R - W + 40

Department of Mathematics
Middle Tennessee State University
Murfreesboro, Tennessee

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

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 proglem. 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.
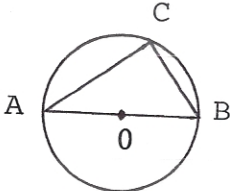
1. $4 - 3 \cdot 6 + 8 \div 4 - 3 =$

    a) 5   b) -15   c) 15   d) -5   e) 11

2. A die has six sides numbered 1 through 6. If we toss a die any of
    the six sides may turn up. What is the probability that the side
    numbered 4 will turn up in a single toss of the die?

    a) 1/6   b) 1/3   c) 1/2   d) 2/3   e) 5/6

3. Which of the following represents the product of a number m and
    six?

    a) 6 + m   b) m ÷ 6   c) m − 6   d) 6 − m   e) 6m

4. How many ways are there to make change for a quarter using only
    nickels and/or pennies?

    a) 10   b) 25   c) 6   d) 4   e) 15

5. How many positive even integers will satisfy $16 \leq x^2 \leq 81$?

    a) 65   b) 9   c) 3   d) 2   e) 6

6. In the given figure, $\overline{AB}$ is a diameter of the given circle. Find
    the measure of ∠ C.

    a) 180°
    b) 45°
    c) 60°
    d) 30°
    e) 90°

7. How many diagonals does an octagon have?

    a) 19   b) 8   c) 16   d) 20   e) 40

8. A quality control inspector found two defective electric blenders
    in a shipment of 100 blenders. At this rate how many blenders
    would be defective in a shipment of 5000?

    a) 100   b) 50   c) 200   d) 150   e) 250

16. If x = -3 and y = 9, then 2x — 3y =
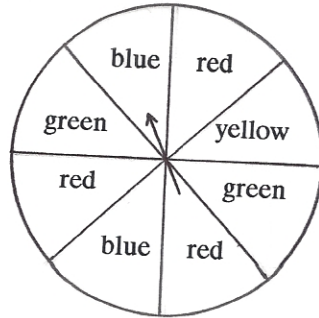
    a) -33   b) 27   c) 81   d) -9   e) -8

17. Jane's school has 1400 students. The teacher-student ratio is
    1:35. How many additional teachers will have to be hired to
    change the ratio to 1:20?

    a) 70   b) 110   c) 30   d) 40   e) 55

18. Refer to the spinner in the illustration. If the spinner is spun,
    find the probability of the spinner stopping on red.

    a) 1/2
    b) 3/8
    c) 1/4
    d) 0
    e) 2/3

19. If a * b = b^a, then 2 * 3 =

    a) 5   b) 6   c) 8   d) 9   e) 3/2

20. What is the double of 2^{30}?

    a) 2^{60} b) 2^{30} c) $2 + 2^{30}$ d) 2^{31} e) 4^{30}

21. Tom makes $255 in 5 days. If he is paid at the same rate, how
    much does he make in 3 days?

    a) $425   b) $51   c) $153   d) $200   e) $175

22. Which of the following is not a rational number?

    a) 22/7   b) 22/14   c) 7/22   d) $\pi/2$ e) π/π
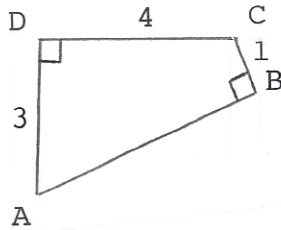
23. $2.4 \times 10^{100} + 0.36 \times 10^{101}$ =

    a) 2.76×10^{100} b) 6×10^{100}
    c) 2.76×10^{101} d) 6×10^{99}
    e) 0.6×10^{100}

24. $\{[(2^{-1})^{-1}]^{-1}\}^{-1}$ =

    a) 2   b) 1/2   c) -1/2   d) 1/4   e) -2

25. Using all of the letters in the word "taxes", how many
    arrangements are possible?

    a) 5   b) 20   c) 1   d) 120   e) 24

26. What is the area of quadrilateral ABCD if ∠ B and ∠ D are right
    angles?

    D   4   C

    a) 8
    b) $6 + \sqrt{6}$
    c) 8.5
    d) 17
    e) $12 + 2\sqrt{6}$

    1
    B
    3

    A

27. A mathematics student has scores of 74, 78, and 70 on three
    examinations. What score is needed on a fourth examination for
    the student to earn an average grade of 80?

    a) 100   b) 98   c) 88   d) 99   e) 86

28. $x^6 \cdot x^3 =$

    a) $2x^{18}$ b) x^{18} c) x^2 d) x^9 e) x^3

29. A landowner wants to fence a rectangular field with 1,080 feet of
    fencing. If he wants the length of the field to be 80 feet longer
    than the width, what would the length be?

    a) 230 feet   b) 200 feet   c) 310 feet   d) 40 feet   e) 300 feet

30. How long does it take to write the numbers from 1 through
    1,000,000 if each digit takes 1 second to write?

    a) 1,000,000 sec.
    b) 5,000,000 sec.
    c) 5,898,349 sec.
    d) 5,888,189 sec.
    e) 5,888,896 sec.

31. If a person takes a five-question true-false test and guesses on
    every question, what is the probability that the score is 100%
    correct?

    a) 1/2   b) 1/4   c) 1/32   d) 1/10   e) 1/16

32. What is the area of the shaded region where the petals are formed
    by constructing semicircles? The center of each semicircle is the
    midpoint of a side.

    8

    a) 64π sq. inches
    b) 32π sq. inches
    c) $64\pi - 32$ sq. inches
    d) $32\pi - 64$ sq. inches
    e) $64\pi + 32$ sq. inches

    8
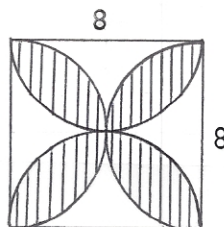
33. How many people can be seated at 12 square tables lined up end to end if each table used individually seats four persons?

   a) 48   b) 24   c) 26   d) 28   e) 36

34. If the measures of the angles of a triangle are known to be x, 14 + 3x and 3(x + 25), find x.

   a) 53°   b) 13°   c) 114°   d) 23°   e) 14.3°

35. (-7/8 x 131/147) + (-7/8 x 16/147) =

   a) -7/8   b) -22/105   c) -115/147   d) -83/121   e) -18/35

36. If a 13-foot ladder is placed against a building so that the base of the ladder is 5 feet away from the building, how high does the ladder reach?

   a) 8 feet   b) 9 feet   c) 10 feet   d) 11 feet   e) 12 feet

37. What is the surface area of a cube whose edges are each 3 feet.

   a) 16 sq. feet
   b) 9 sq. feet
   c) 54 sq. feet
   d) 15 sq. feet
   e) 27 sq. feet

38. Find the least common multiple of 95 and 1425.

   a) 95   b) 1,425   c) 135,375   d) 7,125   e) 21,375

39. If 2x + 3 = 7, then 4x + 9 =

   a) 0   b) 29   c) 1   d) 17   e) -1

40. Find the volume of a cylinder with height 10 cm and diameter 8 cm.

   a) 160π cm^3
   b) 180π cm^3
   c) 200π cm^3
   d) 640π cm^3
   e) 80π cm^3