AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

JUNIOR HIGH/MIDDLE SCHOOL
MATHEMATICS COMPETITION

Prepared by:

SEVENTH GRADE TEST
1989
SCORING FORMULA: 4R - W + 40

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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) ← (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 proglem. Make no stray marks of any kind on your answer sheet.
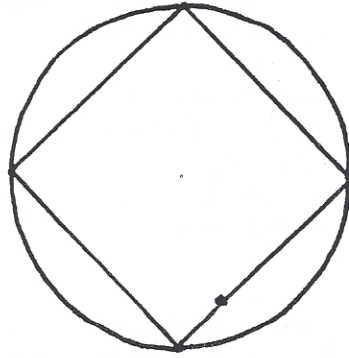
When told to do so, open your test booklet to page 2 and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

1. Which of the following numbers is 1/10 as large as 10.011?

    a) 0.10011   b) 1.0011   c) 100.11   d) 0.010011   e) 1001.1

2. $2 + 8/2 - 2x6 + 4/2$ equals:

    a) ⁻4   b) 8   c) ⁻7   d) ⁻8   e) 11

3. Which of the following numbers is the largest?

    a) 1.2344   b) 1.23$\overline{4}$ c) 1.2$\overline{34}$ d) 1.$\overline{234}$ e) 1.2343

4. If greeting cards cost $2.50 for a box of 12, $1.25 for a packet of 3, or 50 cents each, what is the greatest number of cards that you can purchase for $14.90?

    a) 45   b) 70   c) 54   d) 65   e) 48

5. Find the amount on deposit in a bank at the end of one year if $2000 is deposited at 5% interest compounded semiannually.

    a) $2050   b) $2011   c) $2050.25   d) $2100   e) $2101.25

6. Ninety—nine girls and one boy are in a classroom. How many girls must leave the room so that the percentage of girls becomes 98 percent?

    a) 1   b) 2   c) 98   d) 48   e) 50

7. Sue can buy a bracelet and a watchband for $5, or a watchband and a locket for $6, or a locket and a bracelet for $7. What does the locket cost?

    a) $4   b) $1   c) $2   d) $5   e) $3

8. John drives up a particular hill at an average speed of 30 mph and down the same hill at an average speed of 60 mph. Find his average speed for the round trip.

    a) 90 mph   b) 45 mph   c) 40 mph   d) 30 mph   e) 50 mph

9. What is the valid conclusion for the following argument? If I don't do well in the math contest, then I will not be happy. If I am not happy, then I cannot study hard. I study hard, therefore...

a) I did not do well on the math contest.
b) I did well on the math contest.
c) I am not happy.
d) I did not study hard.
e) none of the above.

10. In order to make the playoffs, Jones Junior High must win its last game and Smith Junior High must lose its last game. The probability that Jones Junior High wins its last game is 0.70. The probability that Smith Junior High wins its last game is 0.40. What is the probability that Jones Junior High makes the playoffs?

a) 1.10   b) 0.28   c) 0.12   d) 0.42   e) 0.18

11. Evaluate the following: $\dfrac{2.4 \times 10^8}{1.5 \times 10^2}$

a) 1.6×10^4 b) 16×10^1 c) $3/2$ d) 1.6×10^6 e) $.9 \times 10^6$

12. How many persons could be served with 10 liters of punch if average consumption per person is 200 cubic centimeters?

a) 5   b) 10   c) 100   d) 20   e) 50

13. Express 0.002050 in scientific notation:

a) $.2050 \times 10^{-2}$
b) 2.050×10^3
c) 20.50×10^{-4}
d) 2.050×10^{-3}
e) 2.050×10^{-4}

14. If March 3, 1992 is on a Tuesday, what day of the week will October 1, 1993 be?

a) Monday   b) Tuesday   c) Wednesday   d) Thursday   e) Friday

15. What percentage of the circle's area is in the inscribed square? The answers have been rounded to the nearest percent.

a) 85%

b) 45%

c) 64%

d) 82%

e) 76%

16. What is one-half of 2^{60} ?

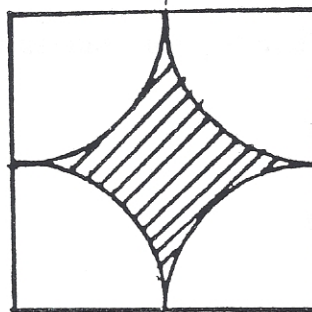a) 1/2 b) 2^{59} c) 2^{30} d) 1^{60} e) 2^{61}

17. Simplify: $\dfrac{1 + \dfrac{1}{1 + 1/3}}{2 + \dfrac{2}{2 + 2/3}}$

a) 11/7 b) 77/16 c) 5/8 d) 5 e) 7/11

18. A square with sides 12 cm has four quarter circles drawn with centers at the four corners and with radii of 6 cm. Find the area of the shaded region.

a) $(144 - 36\pi)$ cm^2

b) 119π cm^2

c) $(144 - 9\pi)$ cm^2

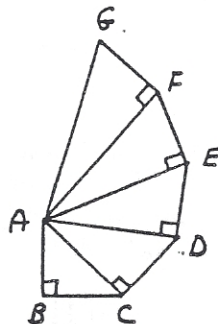d) $(36 - 25/4\pi)$ cm^2

e) not enough information given

19. If 94, 86, 43, and 73 represent four test scores of a student, what score is needed on a fifth test to achieve an average of 79?

a) 92 b) 88 c) 83 d) 94 e) 99

20. In the given figure, $AB = BC = CD = DE = EF = FG = 1$ and the angles at B, C, D, E, and F are right angles as marked. How long is segment AG?

a) 6

b) $\sqrt{6}$

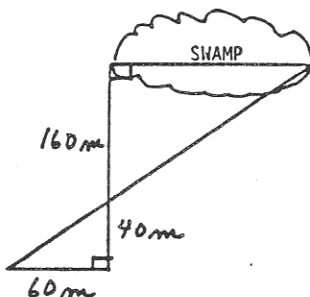c) $\sqrt{5}$

d) 5

e) cannot be determined

21. A cylindrical lamp base has a diameter of six inches and a height of ten inches. What is the area of the portion of the table top that the lamp base covers ?

a) $9\pi^2$ square inches
b) 9π square inches
c) 90π square inches
d) 60π square inches
e) 60 square inches

22. Using the figure below, find the distance across the swamp.

a) 240 m

b) 180 m

c) 160 m

d) 120 m

e) 200 m

23. Tom bought a $30 jacket at a 20% discount and a $20 shirt at a 30% discount. What is the single discount he received on his total purchase?

a) 32%   b) 28%   c) 25%   d) 24%   e) 18%

24. The first twenty—seven numbers in the sequence 2, 22, 222, 2 222, 22 222, ... are added together. What is the digit in the thousands place in their sum?
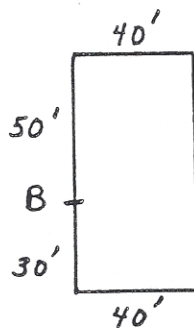
a) 0   b) 3   c) 2   d) 7   e) 6

25. Write as a simple fraction: $4.\overline{24}$

   a) 4.24/1   b) 424/1000   c) 424/100   d) 140/33   e) 14001/3300

26. A survey of 100 commuters showed the following: 59 drove the freeway. 49 wore seat belts. 42 listened to the radio. 20 listened to the radio and wore seat belts. 29 listened to the radio and drove the freeway. 31 drove the freeway and wore seat belts. 12 did all three. How many did none of these three things?

   a) 20   b) 18   c) 11   d) 26   e) 7

27. A goat is put on a 100 foot long chain attached to the barn at point B. The total area outside the barn that is accessible to the goat is:

   a) 5000π square ft.

   b) 6850π square ft.

   c) 7100π square ft.

   d) 8700π square ft.

   e) not enough information given

40'
50'
B
30'
40'

28. The difference between the largest number and the smallest number in the set {.6, .605, .65, .6005} is:

   a) .045   b) .0045   c) .0005   d) .005   e) .05

29. Mary invests $1000 for one year at an annual interest rate of 10%. The Internal Revenue Service requires Mary to pay income tax on her interest at a rate of 28%. How much money does Mary have left at the end of one year after taxes?

   a) $1038   b) $1180   c) $1028   d) $1380   e) $1072

30. In the addition problem at the right, the computation was done in base:

   a) seven
   b) six
   c) ten
   d) eight
   e) none of the above

$$\begin{array}{r} 312 \\ 521 \\ + 113 \\ \hline 1246 \end{array}$$

7.5

31. Fill in the blank so that 24_ 463 527 is divisible by 9.

a) 0   b) 9   c) 4   d) 3   e) 6

32. If a cube holds 8 liters, what is the length of one edge?

a) 30 cm   b) 20 cm   c) 38.6 cm   d) 28.28 cm   e) 282.8 cm

33. In how many different ways can 6 different books be arranged on a shelf?

a) 720   b) 21   c) 2   d) 12   e) 600

34. If a, b, c, and d are positive numbers such that $a/b < c/d$, and $ad = 125$, then:

a) $bc < 125$
b) $bc > 125$
c) $bc = 125$
d) $bc = 1$
e) $bc = 0$

35. How many distinct prime divisors does 420 have?

a) 4   b) 5   c) 10   d) 12   e) 3

36. What is the greatest possible error of measurement in 32.08 cm?

a) .05 cm   b) .005 mm   c) .05 mm   d) .5 cm   e) .5 mm

37. Six boys can build six houses in six days and twelve girls can build twelve houses in twelve days. How many houses can twelve boys and twelve girls build in twelve days?

a) 36   b) 12   c) 28   d) 24   e) 42

38. Let N represent the set of natural numbers, W the set of whole numbers, Z the set of integers, and Q the set of rational numbers. Which of the following statements is not true?

a) W is a subset of Z
b) Z is a subset of Q
c) N is a subset of Q
d) Q is a subset of Z
e) N is a subset of Z

39.   Which of the following numbers is irrational?

a) 1.414   b) 3.1416   c) -4 1/2   d) .6666...   e) none of the
                                                                                          above

40.   If 16 ceramic tiles are required to tile a 9 square foot area, how many square feet
      can be tiled using 272 ceramic tiles?

a) 17   b) 25   c) 153   d) 144   e) 16