AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

Junior High School Mathematics Competition

EIGHTH GRADE TEST
1984

SCORING FORMULA: 4R - W + 40

Prepared by:

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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

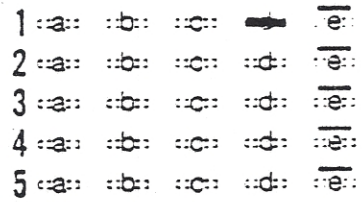
   (a) 0

   (b) 2

   (c) -1

   (d) 1

   (e) none of the above



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. 26 =

   a. 2202_{two}

   b. 10101_{two}

   c. 121_{two}

   d. 11001_{two}

   e. 11010_{two}

2. What is the least positive integer, n, for which $n^2 - n + 11$ is <u>not</u> a prime number?

   a. 3

   b. 11

   c. 14

   d. 7

   e. n - n + 11 is always prime

3. If $\frac{2(5 + 8x)}{7} = 6$ then x =

   a. 4

   b. 1

   c. 3

   d. 2

   e. Not given

4. Let f(x) = 4.2(x - 1). Find f(3).

   a. 12.6x - 12.6

   b. 11.6

   c. 8.4

   d. 16

   e. 24x - 1

5. Suppose you score 80, 77, 81, and 84 on four tests. If you want your average on five tests to be greater than 80, what is the lowest score you can make on the fifth test?

   a. 80

   b. 76

   c. 82

   d. 78

   e. 79

6. If a five foot tall girl casts a shadow four feet long, how tall is a building that casts a twenty foot shadow?

   a. 20 feet

   b. 30 feet

   c. 16 feet

   d. 25 feet

   e. 19.2 feet

7. There are 2 red marbles and 1 blue marble in a box. What is the probability of drawing 2 marbles that are both red?

a. 2/9
b. 1/3
c. 2/3
d. 1/6
e. Not given

8. Bronze consists of $4\frac{1}{2}$ parts of copper by weight to 1 part of tin. How much tin must be used with 1800 pounds of copper to make bronze?

a. 400
b. 2200
c. 8100
d. 40
e. Not given

9. An ordinary die is rolled. What is the probability that the number of dots on its upper face is a prime number?

a. 1/11
b. 1/7
c. 1/2
d. 2/3
e. Not given

10. Find the least common multiple for: 8, 36, 28

a. 168
b. 4
c. 252
d. 504
e. 2016

11. Al had a hit 39 percent of his times at bat. He had 43 hits. How many times at bat?

a. 110
b. 100
c. 50
d. 1.10
e. 1000

12. What is the smallest odd number that has 4 different primes in its prime factorization?

a. 985
b. 429
c. 1155
d. 1345
e. Not given

13. The lengths of the sides of several triangles are given below. Which is a right triangle?

a. 2, 3, 4

b. 4, 5, 6

c. 4, 6, 9

d. 5, 12, 13

e. 5, 6, 8

14. Given: 3 varas = 100 inches. How many square varas are there in a rectangular lot 150 feet long and 100 feet wide?

a. 1944 varas

b. 416 2/3 varas

c. 112 varas

d. 1296 varas

e. Not given

15. Which of the following is an irrational number?

a. 0.333...

b. $\sqrt{9}$

c. 0.818181...

d. 1/7

e. $\sqrt{3}$

16. Sally's Shoe Shop combines sales and sales tax. At the end of the month the total of the sales and sales tax was $12,529.20. The sales tax rate was 6%. How much tax should be sent to the state treasurer?

a. $751.75

b. $75.17

c. $709.20

d. $813.42

e. $70.92

17. A watch and a ring together cost $140. The watch costs $40 more than the ring. How much does the watch cost?

a. $40

b. $100

c. $70

d. $90

e. $99

18. Arrange the 4 fractions 5/8, 3/24, 7/6, 1/3 in order beginning with the greatest.

a. 3/24, 7/6, 5/8, 1/3

b. 7/6, 5/8, 1/3, 3/24

c. 1/3, 7/6, 5/8, 3/24

d. 3/24, 5/8, 7/6, 1/3

e. Not given

19. The deflection of the Earth's curvature is 8 inches for one mile, 2^2 x 8 inches for 2 miles, 3^2 x 8 inches for 3 miles, and so on. Find the height of a light above the sea level that is just visible to a man 15 miles away (approximate).

a. 150 ft.
b. 10 ft.
c. 1800 ft.
d. 1200 ft.
e. Not given

20. If $2 + 3 \cdot 4 * 2 - 4 \cdot 2 = 0$, then * could represent the operation of

a. addition
b. subtraction
c. division
d. multiplication
e. square root

21. The price of a car is discounted 20 percent. What is the amount of the discount if the discounted price is $4400.00?

a. $5,500
b. $2,200
c. $880
d. $1,100
e. Not given

22. Five passengers in planning a trip out west agree to use all possible seating arrangements. Assume they go about 2300 km in a car that has five seats. Approximately how far will they travel between changes in seating?

a. 460 kilometers
b. 20 kilometers
c. 90 kilometers
d. 230 kilometers
e. 115 kilometers

23. If $a = 3$ then $(a + 1)(a - 1)(a + 2)(a - 2)(a + 3)(a - 3) =$

a. 0
b. 27
c. 81
d. 240
e. 729

24. $1 + 2 + 3 + 4 + 5 + \ldots + 100 =$

a. 500
b. 5050
c. 10100
d. 5000
e. 893

25. $\frac{1}{10^2} \div 10^{-3} =$

a. $\frac{1}{10}$

b. $\frac{1}{10^5}$

c. $\frac{1}{10^6}$

d. 10

e. 10^{-1}

26. 0.6222... =

a. $\frac{19}{30}$

b. $\frac{37}{45}$

c. $\frac{28}{45}$

d. $\frac{17}{30}$

e. Not given

27. A cubic meter would be the same as

a. 1,000,000 cm^3

b. 1,000,000 mm^3

c. 10^{-6} km^3

d. 10,000 cm^3

e. Not given

28. The driving wheels of a locomotive have a diameter of 6 feet 6 inches. Approximately how many revolutions a minute must each wheel make to travel 40 miles an hour?

a. 172

b. 86

c. 3520

d. 1760

e. Not given

29. Each day either Abe walks to work and rides his bike home, or vice versa. Either way, the round trip takes one hour. If he were to ride both ways, the round trip would take 30 minutes. How long would it take to walk both ways?

a. one hour

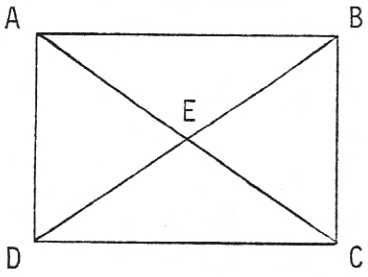
b. 1½ hours

b. 45 minutes

d. two hours

e. 30 minutes

30. Given rectangle ABCD, $\measuredangle EDC$ measures 35^{o}. Find the measure of $\measuredangle DEA$.



a. 55^{o} b. 110^{o}

c. 70^{o} d. 130^{o}

e. Not given

31. Which of the following numbers is between $.\overline{52}$ and $.\overline{53}$?

a. $.\overline{5}$ b. $.\overline{521}$

c. .52 d. $.\overline{531}$

e. Not given

32. If set A contains 27 objects, set B contains 43 objects, and 15 of the objects are common to both sets A and B, then the total number of objects in A $\cup$ B is

a. 85 b. 70

c. 58 d. 40

e. 55

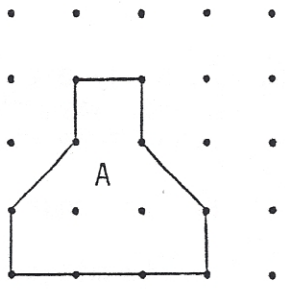
33. One box contains 3 red checkers and 4 black checkers. A second box contains 5 red checkers and 3 black checkers. One is drawn from each box. What is the probability that they are both red?

a. 14/23 b. 15/46

c. 15/56 d. 3/8

e. Not given

34. A parachutist falls randomly inside the grid shown. What is the probability that he lands in region A?



a. 6/25 b. 3/8

c. 1/3 d. 2/5

e. 1/2

35. The measure 48,000 expressed in scientific notation is

a. 4.8000×10^{4} b. 0.48×10^{5}

c. 48×10^{3} d. 4.8×10^{5}

e. Not given

36. If $x = a - ax$, then $x =$

a. $\frac{1+a}{a}$ b. $\frac{1-a}{a}$

c. $\frac{a}{1+a}$ d. $\frac{a}{1-a}$

e. Not given

37. $(-\frac{1}{4})^{-2} =$

a. 1/16 b. 16

c. - 1/16 d. -16

e. Not given

38. When Alf, Betty, and Cal dine out, each orders beef or pork. If Alf orders beef, Betty takes pork. Either Alf or Cal order beef but not both. Betty and Cal do not both order pork. Who could have ordered beef yesterday and pork today?

a. Alf b. Betty

c. Cal d. Betty or Cal

e. All three people

39. .25% =

a. 1/4 b. 1/25

c. 1/40 d. 1/400

e. Not given

40. A circle of radius 1 rolls without slipping around a 2nd circle of radius 2. How many times will the first circle rotate in rolling around the 2nd circle exactly one time?

a. 1 b. 2

c. 3 d. 4

e. Not given