AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

Junior High School Mathematics Competition

EIGHTH GRADE TEST
1985
SCORING FORMULA: 4R - W + 40

Prepared by:

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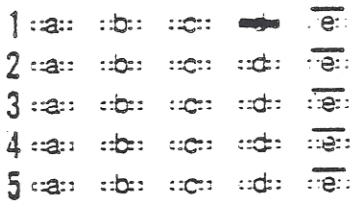
DIRECTIONS:

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. $\frac{(-36)(-48)}{-12} =$

   a. 12

   b. -12

   c. 108

   d. 144

   e. -144

2. The lowest temperature ever recorded in Nashville is -17^{o} F. How many degrees is this below freezing?

   a. 17

   b. 15

   c. 32

   d. -17

   e. 49

3. If event A can occur in 8 different ways and then event B can occur in 4 ways, how many ways are there for both events to occur where A occurs first?

   a. 12

   b. 2

   c. 32

   d. 4

   e. 24

4. $3.2 \times 10^{-2} + 2.6 \times 10^{-2} + 4.2 \times 10^{-2} =$

   a. .01

   b. .0091

   c. .001

   d. .1

   e. .34944

5. $\frac{(.000004) \times (.00008)}{(.0000000000002)} =$

a. 16

b. 1600

c. 160

d. 1.6

e. 16000

6. $7 \div 7 \div 7 \div 7 \div 7 \div \frac{1}{7} \div \frac{1}{7} \div \frac{1}{7} =$

a. 1

b. 49

c. 7

d. 243

e. $\frac{1}{7}$

7. The solution for the equation $\frac{1}{3}x + \frac{1}{9} = 3$ is

a. $7\frac{4}{9}$

b. $9\frac{1}{3}$

c. $6\frac{2}{3}$

d. $8\frac{2}{3}$

e. $8\frac{2}{9}$

8. The shaded area in the Venn Diagram below represents

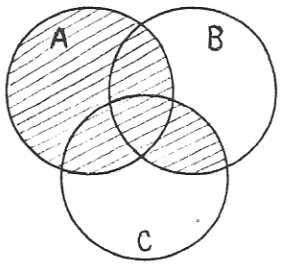
a. $(A \cap B) \cap C$

b. $(A \cup B) \cap C$

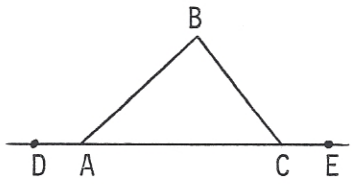
c. $(A \cup B) \cup C$

d. $A \cap (B \cup C)$

e. $A \cup (B \cap C)$



9. In the figure below $\angle B$ is a right angle and $m(\angle DAB) = 130$. Then $m(\angle BCE) =$



a. 130

b. 140

c. 145

d. 150

e. 155

10. A two-digit number has a ten's digit of t and a unit's digit of u. A three-digit number is formed by placing a 1 to the right of these two digits. The new number is equal to

a. $10t + u + 1$

b. $100u + 10t + 1$

c. $t + u + 1$

d. $100t + 10u + 1$

e. $100 + 10t + u$

11. Two boys and two girls are to throw pennies into a wishing well. The first person throws in 2 pennies. After the first person, each boy throws in 3 times as many as the previous person and each girl throws in 2 times as many as the previous person. The largest possible number of pennies thrown in by all 4 children is

a. 42

b. 54

c. 56

d. 62

e. 72

12. 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?

a. 35 miles

b. $27\frac{1}{2}$ miles

c. 45 miles

d. 30 miles

e. $47\frac{1}{2}$ miles

13. $(0.252525...) \div (0.1111...) =$

a. $\frac{25}{11}$

b. 2.5

c. $2\frac{2}{11}$

d. 2.5252525...

e. 25.252525...

14. 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?

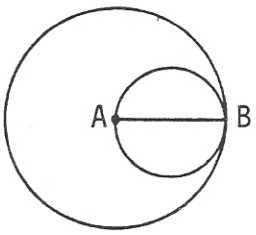
a. $\frac{1}{5}$

b. $\frac{1}{3}$

c. $\frac{2}{9}$

d. $\frac{1}{4}$

e. $\frac{1}{\pi}$



15. After $\frac{1}{3}$ of a trip that requires $\frac{1}{2}$ of a tank of gas, 3 gallons have been used. How many gallons does the tank hold?

a. 18

b. 9

c. 6

d. 12

e. 16

16. If a number is divisible by 5 then the unit's digit of its base-five numeral is

a. 0

b. 1

c. 2

d. 3

e. 5

17. A die is tossed twice. What is the probability that the product of the numbers on the top faces is 6?

a. $\frac{5}{18}$

b. $\frac{1}{9}$

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

d. $\frac{1}{18}$

e. $\frac{11}{36}$

18. How many whole numbers between 300 and 800 have no digits repeated in their numeral?

a. 360

b. 288

c. 400

d. 405

e. 340

19. What is the hundred's digit of 5^{83}?

a. 1

b. 3

c. 5

d. 6

e. 7

20. What is the smallest positive integer that has four different (distinct) prime factors and is not a multiple of 10?

a. 84

b. 462

c. 126

d. 42

e. 210

21. The funds for a new library costing $160,000 were donated by 80% of the 20,000 families residing there. What was the average contribution per contributing family?

a. $10

b. $8

c. $6.40

d. $9.40

e. None of the above

22. A car is on sale for $5,397.50 which is 15% off the retail price. What is the retail price?

a. $6625.00

b. $6207.13

c. $8096.25

d. $6350.00

e. $4587.88

23. 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

24. If a rectangle and a triangle are drawn so that no side of the triangle is parallel to a side of the rectangle, what is the maximum possible number of points of intersection?

a. 3

b. 4

c. 5

d. 6

e. 7

25. The mean distance of Mars from the sun is 1.41×10^8 miles. The mean distance from earth to the sun is 9.3×10^7 miles. How much closer to the sun is the earth than Mars?

a. 4.8×10^7 miles

b. 7.89×10^7 miles

c. 4.8×10^8 miles

d. 7.89×10^8 miles

e. None of the above

26. If $x = 16$ then $5x^0 + 2x^{1/2} + x^{-1} =$

a. $9\frac{1}{16}$

b. $13\frac{1}{16}$

c. 29

d. $8\frac{1}{16}$

e. -3

27. During the one-hour period between 6:00 and 7:00, for how many minutes is exactly one "2" displayed on an electronic digital clock?

a. 19

b. 17

c. 16

d. 15

e. 14

28. A sweater was marked 60% off and then later discounted an additional 20% of the sale 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

29. The natural numbers x and y have the following properties:

(1) x is a factor of 12
(2) x + y = 15
(3) y is not prime
(4) 3 is not a factor of y

Then

a. x = 5 and y = 10

b. x = 6 and y = 8

c. x = 4 and y = 11

d. x = 3 and y = 12

e. x = 1 and y = 14

30. In a double elimination tournament, each team is eliminated when it accumulates two losses. The championship team may have one loss or zero losses. How many total games will be played if there are n teams in a double elimination tournament?

a. n or n - 1

b. n + 1 or n

c. 2n

d. 2n or 2n - 1

e. 2n - 2 or 2n - 1

31. 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

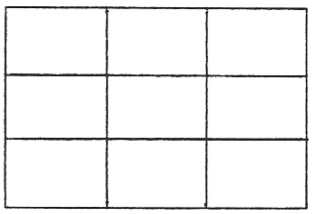
c. 6 to 1

d. 9 to 1

e. 24 to 1

32. How many rectangles are pictured below?

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



33. In the figure below AB = 2, BC = 3, and $\overline{BE} \| \overline{CD}$. The ratio of the area of $\triangle ABE$ to the area of trapezoid BEDC is

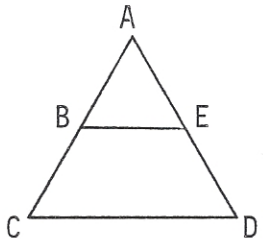
a. $\frac{2}{5}$

b. $\frac{4}{25}$

c. $\frac{6}{25}$

d. $\frac{4}{21}$

e. $\frac{4}{9}$



34. Which of the following is a true sentence?

a. $10^{10} < 2^{30} < 3^{20}$

b. $3^{20} < 2^{30} < 10^{10}$

c. $10^{10} < 3^{20} < 2^{30}$

d. $2^{30} < 10^{10} < 3^{20}$

e. $2^{30} < 3^{20} < 10^{10}$

35. Which of the following is most likely to happen?

a. Getting a 2 with a single toss of a die

b. Getting a sum of 6 with a single toss of a pair of dice

c. Getting a sum of 10 with a single toss of a pair of dice

d. Getting two heads with two tosses of a single coin

e. Getting a prime number from a random selection of one number from {2, 4, 6, 8, 10}

36. $1 - 2 + 3 - 4 + 5 - 6 + 7 - \ldots + 99 =$

a. -50

b. -49

c. 0

d. 49

e. 50

37. The population of city A is 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

38. In the accompanying figure,

$m(\angle A) + m(\angle B) + m(\angle C) + m(\angle D) + m(\angle E) + m(\angle F) + m(\angle G) + m(\angle H) =$

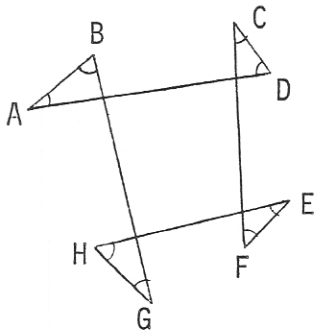
a. 420

b. 320

c. 540

d. 360

e. 720



39. A fly landed at random on one of the five squares pictured below and then randomly moved to an adjacent square. What is the probability that the fly ended up on the red square? (Adjacent squares have a common edge.)

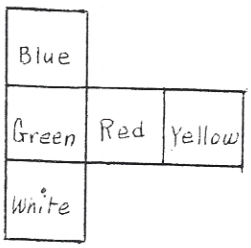
a. $\frac{1}{2}$

b. $\frac{4}{15}$

c. $\frac{1}{3}$

d. $\frac{1}{4}$

e. $\frac{1}{5}$



40. If A = {3, 5}, B = {4, 5, 12}, and C = {5, 13} and if x is selected randomly from A, y from B and z from C, what is the probability that a right triangle can be formed with sides of length x, y and z?

a. $\frac{1}{2}$

b. $\frac{1}{6}$

c. $\frac{1}{4}$

d. $\frac{1}{3}$

e. $\frac{1}{12}$