AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37040

Junior High School Mathematics Competition

EIGHTH GRADE TEST
1982
SCORING FORMULA: 4R - W + 40

Prepared by:

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Austin Peay State University
and
Middle Tennessee State University

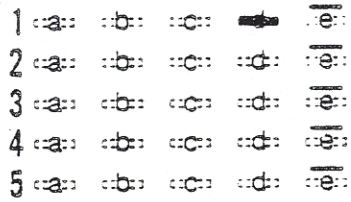
DIRECTIONS:

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



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.

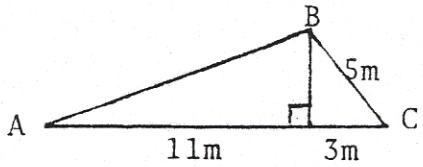
When told to do so, open your test booklet to page 2 and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

1. The number of elements in Set S is 7. The number of subsets that set S has is

   a. 130 b. 125
   c. 7 d. 64
   e. 128

2. The area of triangle ABC is

   a. $28\ m^2$ b. $56\ m^2$
   c. $32\ m^2$ d. $42\ m^2$
   e. $35\ m^2$



3. 1/2% of $98.00 is

   a. $9.80 b. $4.90
   c. $49.00 d. $0.49
   e. $19.60

4. Simplify: $2^{-1} + 3^{-1} - 5^{-1}$

   a. 0 b. 19/30
   c. 31/30 d. 4/11
   e. -10

5. 3! + 4! = _____.

   a. $3 \cdot 4$ b. $3^2 + 4^2$
   c. $5 \cdot 6$ d. 5!
   e. 7!

6. When -6 1/2 is divided by +5 1/3 the result is

   a. -1 7/32 b. -34 2/3
   c. 39/32 d. 32/39
   e. None of the above

7. Find the value of (4 + 3 x 7 + 10 ÷ 2) + 8 ÷ 4

   a. 111 b. 247
   c. 120 d. 60
   e. 32

8. Find an irrational number between 1.414 and 1.415

a. 1.4145
b. 1.415111...
c. 1.4141141114...
d. There is no irrational number between the two.
e. None of the above.

9. If $s = \sqrt{a} + b \cdot (10-3c)$ when a=9, b=2, and s=11, Find c

a. 3
b. 4
c. -2
d. 2
e. Cannot be determined from the given information.

10. The graph of $y > x-5$ contains all but which of the following points?

a. (0,6)
b. (1,4)
c. (4,1)
d. (0,0)
e. (6,0)

11. Which answer is an example of the associative property.

a. $(2 + 4) + 6 = (4 + 2) + 6$
b. $(2 + 4) + 6 = 2 + (4 + 6)$
c. $2 + (4 + 6) = (4 + 6) + 2$
d. $2 \cdot (4 + 6) = 2 \cdot 4 + 2 \cdot 6$
e. $2 + 4 = 4 + 2$

12. The number of significant digits in the measurement 3.8400×10^6 is

a. 1
b. 2
c. 3
d. 4
e. 5

13. The lengths of the three sides of several triangles are given below. Which of these triangles is an obtuse triangle?

a. 3, 3, 3
b. 7, 7, 8
c. 6, 8, 10
d. 5, 12, 14
e. 5, 12, 12

14. $.\overline{45} + .\overline{63} =$

a. 12/11
b. $1.\overline{08}$
c. 4/3
d. $\overline{1.08}$
e. 1.08

15. An invader from outer space is attacking an earth base station. Luke and Leia are sent in separate rocket crafts to intercept and destroy the invader. Luke has a .8 probability of destroying the invader on the first shot, while Leia's probability is .9. If they each fire once, what is the probability the invader will be destroyed.

a. .92 b. .8
c. .9 d. .98
e. 1.7

16. In 1982 a Chevrolet Chevette sells for $7,000. At an inflation rate of 10%, what would you expect to pay in 1984?

a. $8,400 b. $7,700
c. $8,470 d. $7,000
e. $9,317

17. One car begins at 1:00 traveling west at 30 m.p.h. and a second car begins 2 hours later traveling east at 50 m.p.h. At what time will they be 260 miles apart?

a. 3:30 b. 5:30
c. 4:15 d. 5:15
e. 3:00

18. When the length of each side of a square is increased by 5 cm, the area is increased by 85 cm^2. Find the length of a side of the original square.

a. 5 cm b. 6 cm
c. 7 cm d. 8 cm
e. None of the above.

19. If the perimeter of an equilateral triangle with side 8 is equal to the perimeter of a square with side s, what is the area of the square?

a. 6 b. 12
c. 24 d. 36
e. 64

20. A container has two very long strings in it. If a person reaches into the container and randomly ties two ends together, what is the probability that the container now has 1 (elongated) string?

a. 2/3 b. 3/4
c. 1/2 d. 1/4
e. 1/3

28. Tom wishes to average 50 m.p.h. on a 50 mile trip. If he drives 40 m.p.h. for the first 25 miles, how fast should he drive for the last 25 miles?

a. 60 m.p.h.
b. 55 m.p.h.
c. 62 m.p.h.
d. 64 1/3 m.p.h.
e. 66 2/3 m.p.h.

29. A bag contains 6 green marbles, 4 white marbles, and 3 blue marbles. One marble is drawn and not replaced. Then a second marble is drawn. What is the probability that the first marble is blue and the second green?

a. 3/26
b. 18/169
c. 9/169
d. 9/13
e. 15/156

30. A basketball player is awarded a "one and one" free throw opportunity which means that he is given a first shot and if he makes that one he gets to shoot a second one. His probability of making any free throw is 2/3. Which of the following is a true statement?

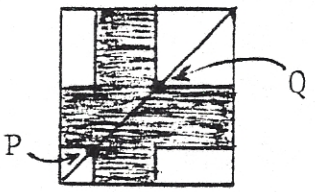
a. One point is the most likely outcome.
b. Two points is the most likely outcome.
c. Zero points is the most likely outcome.
d. Two points is the least likely outcome.
e. Zero points is the least likely outcome.

31. What number must be inserted in the list 80, 90, 78, 98, 92 so that the mean of the numbers in the new list is 85?

a. 85
b. 72
c. 92
d. 60
e. Not possible to determine.

32. If P and Q are any two points on the diagonal of a 2 x 2 square such that the length of $\overline{PQ}$ is 1. then the area of the shaded region is:

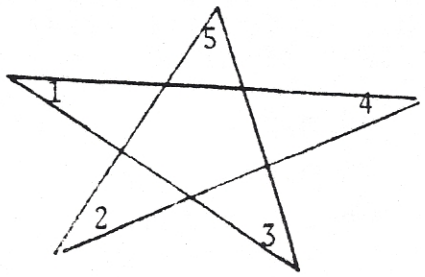
a. 3
b. $2\sqrt{2} + .5$
c. $2\sqrt{2}-1$
d. $4-2\sqrt{2}$
e. $2\sqrt{2}-.5$



33. Ohm's Law states that in a simple circuit, voltage (volts) equals current (amps) times resistance (ohms). If a circuit has a 12 volt battery across a 300 ohm resistor, then how much current will flow?

a. 25 amps
b. 3600 amps
c. .04 amps
d. 312 amps
e. .25 amps

21. Find the sum of the measures of $\angle 1, \angle 2, \angle 3, \angle 4$, and $\angle 5$.



a. 180° b. 360°

c. 540° d. 720°

e. Cannot be determined.

22. To convert degrees into radians, multiply the number of degrees by

a. π b. $1/\pi$

c. $\pi/360^\circ$ d. $180^\circ/\pi$

e. $\pi/180^\circ$

23. $16^{(-3/4)} =$

a. -12 b. $-1/8$

c. $1/8$ d. $1/12$

e. None of these.

24. If $f : x \to 2x + 4$ and $f(c) = 10$ then $c =$

a. 24 b. $2c + 4$

c. x d. 7

e. 3

25. If $x = a - ax$, then x equals

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

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

e. None of the above.

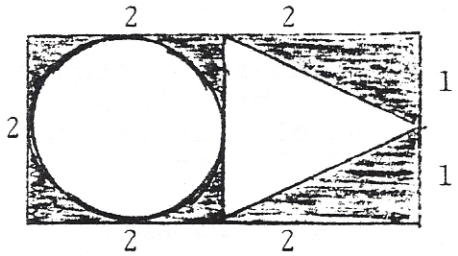
26. The least common multiple of $6(x + y)^2$ and $4xy^2(x + y)$ is

a. $24xy^2(x + y)^3$ b. $24xy^2(x + y)^2$

c. $12xy^2(x + y)^3$ d. $12xy^2(x + y)^2$

e. None of the above.

27. The area of the shaded region is



a. $16 - 4\pi$ b. $8 - \pi$

c. $8 - 2\pi$ d. $6 - \pi$

e. None of these.

34. Give the simplest fractional name for 3/4%.

a. .75
b. .0075
c. .075
d. 75
e. None of the above.

35. Convert the base ten fraction 47/12 to base five.

a. $42_5/22_5$
b. $140_5/20_5$
c. $142_5/22_5$
d. $102_5/32_5$
e. None of these.

36. What is the value of Y when the program is executed

a. 5
b. 1
c. 15
d. 25
e. 0

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10 LET Y = 0
20 FOR I = 1 to 5
30 LET Y = Y + I
40 NEXT I
50 PRINT Y
60 END
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37. If a coin is tossed 4 times, what is the probability of getting a head and 3 tails?

a. 1/2
b. 3/4
c. 1/8
d. 1/4
e. None of the above.

38. Which of the following is equivalent to saying that A is a subset of B?

a. A has fewer elements than B.
b. The intersection of A and B is the null set.
c. A is an empty set.
d. The union of A and B is A.
e. The intersection of A and B is A.

39. Find the length of a side of a square with 10 in. diagonal.

a. 6.7
b. 7.9
c. 7.1
d. 8.3
e. 7.5

40. The LCM of 8, 24, and 27 is

a. 5184
b. 108
c. 432
d. 216
e. 648