1998 SEVENTH GRADE MATHEMATICS COMPETITION

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE

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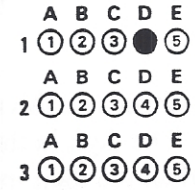
Seventh Grade Test
1998
Scoring Formula: 4R - W + 40

DIRECTIONS:

This is a test of your competence in middle 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.

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 d); so you would answer this problem by darkening the space on the answer sheet corresponding with this choice.

If you change your mind about your 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 and begin. When you have finished one page, go on to the next. The working time for the entire test is 60 minutes.

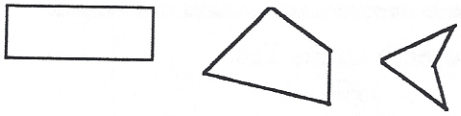
1. In Sunnyside, $\frac{1}{6}$ of the downtown workers drive to work. Of those who do not drive, $\frac{3}{16}$ ride bicycles to work. What fraction of the workers ride bicycles to work?

a. $\frac{1}{32}$ b. $\frac{3}{16}$ c. $\frac{17}{48}$ d. $\frac{1}{8}$ e. $\frac{5}{32}$

2. If the following distances were arranged in order from the smallest to the largest, which one would be in the middle? 8 cm, 5200 mm, 245 cm, 91mm, 6 m

a. 8 cm b. 5200 mm c. 245 cm d. 91mm e. 6m

3. Here are some examples of quadrilaterals:



What is the maximum number of points of intersection of a quadrilateral and a triangle if no side of either polygon is on the same line?

a. 3 b. 4 c. 6 d. 8 e. 10

4. A baseball league has 8 teams. In each round of play, each team plays each other team once. After 4 rounds how many games have been played?

a. 28 b. 32 c. 64 d. 112 e. 224

5. My locker number at school is a three-digit number. The product of the digits is 12. The sum of the digits is 9. The digit in the tens place is higher than the digit in the hundreds place, and it is lower than the digit in the ones place. What is the second digit in my locker number?

a. 1 b. 2 c. 3 d. 4 e. 6

6. Three apples and two pears cost \$.78. But two apples and three pears cost \$.82. What is the total cost of one apple and one pear?

a. \$.16 b. \$.23 c. \$.32 d. \$.41 e. \$.80

7. Suppose you are planning to purchase some rope. You need 15 pieces that are 7 inches long and one piece that is 80 inches long. The rope can be purchased in multiples of 12 inches. How much rope should you buy to minimize waste?

a. 180 inches b. 192 inches c. 204 inches d. 216 inches e. 228 inches

8. Fifteen pears, 25 apples, and 35 oranges are to be packed in 2 or more baskets. What is the least number of baskets needed if each basket is to have identical contents?

a. 2 b. 3 c. 5 d. 7 e. 10

9. What is the circumference of a circle that has the same area as a square having perimeter 2π?

a. $\pi\sqrt{\pi}$ b. $2\sqrt{2}$ c. $\frac{\pi}{2}$ d. $\frac{\sqrt{2}}{\pi}$ e. 2

10. An item is discounted 25%, and then another 15% discount is given on the new price. What percent of the original price is the final price?

a. 3.75% b. 40% c. 42.25% d. 60% e. 63.75%

11. Suppose you know that there are ten black and ten blue socks in your drawer. The room is dark and you cannot turn on a light. What is the least number of socks that you must take out of your drawer to be certain you have two socks of the same color?

a. 2 b. 3 c. 5 d. 10 e. 11

12. If 1 is the first odd number, 3 is the second odd number, 5 is the third odd number, and so on, which odd number is 2001?

a. 999th b. 1000th c. 1000.5 th d. 1001 st e. 1002 nd

13. Suppose you are the buyer for a hat shop and decide to order hats in only one size for the coming season. To decide which size to order, you look at last year's sales figures which are itemized according to size. To determine what size to order you should find the

a. mode for the data.
b. median for the data.
c. mean for the data.
d. range for the data.
e. standard deviation for the data.

14. A farmer tells you that he has only horses and chickens, and that he counted 13 heads and 36 feet. How many horses does the farmer have?

a. 4 b. 5 c. 6 d. 7 e. 8

15. The radio station gave away a discount coupon for every fifth and sixth caller. Every 21st caller received free concert tickets. Which caller was the first to get both a coupon and a concert ticket?

a. 126 b. 105 c. 84 d. 42 e. 21

16. $\frac{2+3\cdot 6}{6\cdot 2} =$

a. $\frac{5}{3}$ b. $\frac{5}{2}$ c. 3 d. $\frac{20}{3}$ e. 10

17. A day-care service makes a profit of $700 per week. What are the operator's costs if this profit is 17.5% of his total income?

a. $3500 b. $3300 c. $3100 d. $2900 e. $2700

18. I'm thinking of some 3-digit numbers. In each, the digit in the hundreds place is larger than 7, the digit in the tens place is odd, and the sum of the three digits is 10. What is the maximum number of 3-digit numbers I could be thinking of?

a. 2 b. 3 c. 4 d. 5 e. 10

19. An automobile with a speed of 50 miles per hour travels a distance of 100 miles from town A to town B. A fast-flying Texas beetle traveling 200 miles per hour leaves the windshield of the automobile as it departs from town A. The beetle flies to town B, back to the auto, back to town B, back to the auto, and so on until the automobile reaches town B. How far does the Texas beetle fly?

a. 400 miles
b. 200 miles
c. 100 miles
d. 50 miles
e. not enough information is given

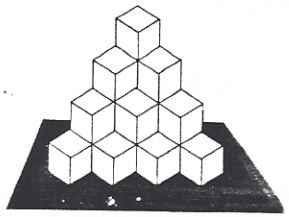
20. Mel's Diner offers the following menu in their restaurant:

Main course:	prime rib, steak, chicken, ham, shrimp
Beverage:	coffee, tea, milk
Dessert:	ice cream, sherbet, cheesecake

If someone who does not know you orders a meal (consisting of main course, beverage, and dessert) for you at Mel's Diner and you want prime rib, milk, and ice cream, what is the probability that you will receive what you want?

a. $\frac{1}{55}$ b. $\frac{1}{45}$ c. $\frac{1}{15}$ d. $\frac{1}{11}$ e. $\frac{1}{3}$

21. What is the ratio of the number of cubes that touch the floor to the number of cubes that do not touch the floor in the stack of cubes pictured below?



a. $\frac{1}{1}$ b. $\frac{1}{2}$ c. $\frac{2}{1}$ d. $\frac{3}{5}$ e. $\frac{5}{3}$

22. In a class of 30 students, 20 students indicate that they exercise at least four times a week, and 15 indicate that they average 8 hours of sleep a night. What is the greatest possible number of students who do neither?

a. 5 b. 10 c. 12 d. 15 e. 20

23. Garth has decided to increase his physical stamina. Each morning he does pushups, increasing the number completed by 6 each day. He does a total of 100 pushups during the first five days. How many did he do on the third day?

a. 14 b. 18 c. 20 d. 22 e. 26

24. Before checking with the caterer, a cook cuts a cake into 35 equal pieces and an identical cake into 42 equal pieces. The caterer, however, insists that the cakes be cut exactly alike. What is the smallest number of pieces each cake can now have?

a. 77 b. 133 c. 147 d. 210 e. 735

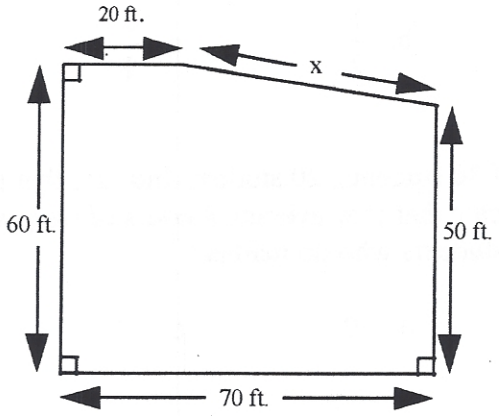
25. The least common multiple of two numbers is $2^2 \cdot 3^4 \cdot 7 \cdot 11 \cdot 13$. The greatest common divisor of the same two numbers is $2 \cdot 3 \cdot 7$. One of the numbers is $2^2 \cdot 3 \cdot 7 \cdot 11$. What is the other number?

a. $3^4 \cdot 13$
b. $2^2 \cdot 3^4 \cdot 7 \cdot 13$
c. $2 \cdot 3^4 \cdot 7 \cdot 13$
d. $2^2 \cdot 3 \cdot 7 \cdot 13$
e. $2 \cdot 3^4 \cdot 7 \cdot 11 \cdot 13$

26. A bug is inside a 4 ft. x 4 ft. x 2 ft. box with closed lid. Specifically, the bug is on the ceiling of the box at a corner. On the floor of the box, in the extreme opposite corner, is a piece of candy. The bug cannot fly; it must crawl. What is the shortest distance to the candy for the bug?

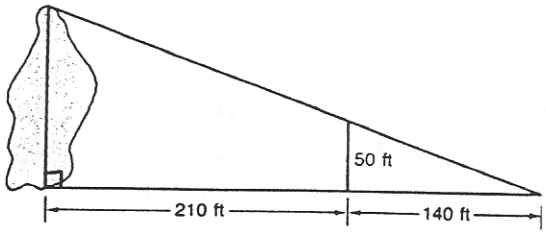
a. $4+\sqrt{6}$ ft. b. $2+\sqrt{8}$ ft. c. $4+\sqrt{20}$ ft. d. $2+\sqrt{32}$ ft. e. $2\sqrt{13}$ ft.

27. The length of side x in the figure is



a. $\sqrt{2400}$ ft. b. $\sqrt{2500}$ ft. c. $\sqrt{2600}$ ft. d. $\sqrt{2800}$ ft. e. $\sqrt{2900}$ ft.

28. What is the length of the lake pictured below?



a. 75 ft. b. 125 ft. c. 130 ft. d. 140 ft. e. 150 ft.

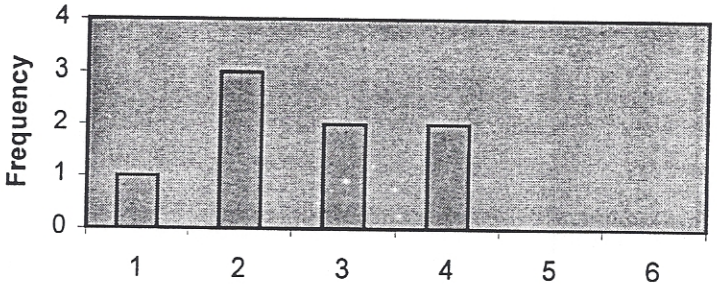
29. What is the 101st digit in the decimal representation of $\frac{26}{111}$?

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

30. Which of the following statements is false?

a. Every square is a rectangle.
b. Every equilateral triangle is isosceles.
c. Every rectangle is a quadrilateral.
d. Every parallelogram is a rhombus.
e. Every rectangle is a parallelogram.

31. Find the mean of the data illustrated in this histogram.



a. $\frac{5}{8}$ b. $\frac{5}{2}$ c. 2 d. $\frac{21}{4}$ e. $\frac{21}{8}$

32. How far from the base of a building must a 13-ft. ladder be placed so that it reaches 12 ft. up one wall?

a. 3 ft. b. 4 ft. c. 5 ft. d. 6 ft. e. 7 ft.

33. If the edge of a cube is doubled, the new surface area is _____% greater than the old surface area.

a. 50 b. 100 c. 200 d. 300 e. 400

34. Select the largest of the numbers below.

a. $\sqrt{3}$ b. $\left(\frac{1}{8}\right)^{-\frac{1}{2}}$ c. $\sqrt[3]{7}$ d. $\frac{\frac{1}{2}}{\frac{1}{3}}$ e. $(.9)^{100}$

35. A certain mathematics test consists of ten true-false questions. Peppermint Parry wished to answer the questions without reading them. In how many ways can she fill in the answer sheet?

a. 20 b. 100 c. 512 d. 1024 e. 2048

36. If a and b are integers such that $a > b$, which is the following **must be** true?

a. $-2a > -2b$

b. $a^2 > b^2$

c. $\frac{a}{b} > 1$

d. $|a| > |-b|$

e. $a - b > 0$

37. If 0 degrees Centigrade is the temperature at which water freezes and 100 degrees Centigrade is the temperature at which water boils, which of the following is a reasonable temperature of a nice day to swim at the beach?

a. 5 degrees Centigrade

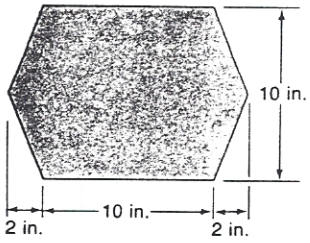
b. 10 degrees Centigrade

c. 30 degrees Centigrade

d. 60 degrees Centigrade

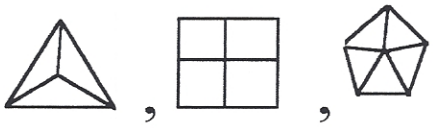
e. 80 degrees Centigrade

38. What is the area of the shaded region below?



a. 110 sq. in. b. 115 sq. in. c. 120 sq. in. d. 125 sq. in e. 140 sq. in.

39. What is the next figure in this sequence?



a.  b.  c.  d.  e. 

40. Arrange the following numbers in order from smallest to largest.

$.9,\ \frac{1}{3},\ .333,\ \frac{1}{9},\ .3,\ .999$

a. $.3,\ .333,\ \frac{1}{3},\ .999,\ .9,\ \frac{1}{9}$

b. $\frac{1}{9},\ \frac{1}{3},\ .333,\ .3,\ .999,\ .9$

c. $\frac{1}{3},\ .3,\ .333,\ \frac{1}{9},\ .9,\ .999$

d. $\frac{1}{3},\ .333,\ .3,\ .999,\ .9,\ \frac{1}{9}$

e. $\frac{1}{9},\ .3,\ .333,\ \frac{1}{3},\ .9,\ .999$