2003 MIDDLE SCHOOL MATHEMATICS COMPETITION

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE

MIDDLE TENNESSEE STATE UNIVERSITY
MURFREESBORO, TENNESSEE

Seventh Grade

Scoring Formula: 4R - W + 30

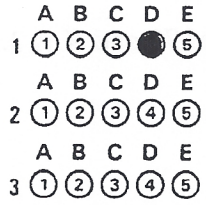
Tests were developed with support from the Tennessee Center for the Advancement of Mathematics, Science and Technology Education at Middle Tennessee State University, Ray Phillips, Director

DIRECTIONS:

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. There are 30 questions in all. The working time for the entire test is 60 minutes.

1. I bought more than 10 pencils. All the pencils were the same price. I paid $15.37 (before tax). How many pencils did I buy and how much did each cost? (The price of each pencil was a whole number of cents.)

   a. There is exactly one possible solution to the problem.
   b. There are exactly two possible solutions to the problem.
   c. There are exactly three possible solutions to the problem.
   d. There are more than three possible solutions to the problem.
   e. There are no possible solutions to the problem.

2. Two hundred trolls divided a block of gold evenly. What percent of the block of gold did each troll receive?

   a. 200%
   b. $\frac{1}{200}\%$
   c. 2%
   d. 0.5%
   e. 0.2%

3. The ratio of boys to girls in the chess club was 5:3. If eight more girls joined the chess club, there would be the same number of boys and girls. How many girls are currently in the chess club?

   a. There are currently 12 girls in the chess club.
   b. There are currently 64 girls in the chess club.
   c. There are currently 120 girls in the chess club.
   d. There are currently 60 girls in the chess club.
   e. There are currently 24 girls in the chess club.

4. The greatest common factor of 72 and X is 3. The least common multiple of 72 and X is 1800. What must be true?

   a. X is less than 72.
   b. X is multiple of 5.
   c. X is a multiple of 72.
   d. X is a factor of 3.
   e. X is even.

5. Define the operation A * B to be $^{-}3A+B$. Evaluate $^{-}6 * {}^{-}5$.

   a. $^{-}11$
   b. $^{-}23$
   c. 23
   d. 13
   e. $^{-}13$

6. One fifth of a truckload of apples were green; the rest were red. Two thirds of the green apples were bruised. Five twelfths of the red apples were bruised. There were 84 bruised apples. How many of the green apples were NOT bruised?

   a. There were 56 green apples that were not bruised.
   b. There were 28 green apples that were not bruised.
   c. There were 35 green apples that were not bruised.
   d. There were 24 green apples that were not bruised.
   e. There were 12 green apples that were not bruised.

7. I travel 27 inches with each step I take. There are 5,280 feet in a mile. What would be the best estimate for the number of steps I take to walk a mile?

   a. 2,500 steps
   b. 200 steps
   c. 5,000 steps
   d. 3,000 steps
   e. 1,500 steps

8. The first four figures in a sequence are shown below.

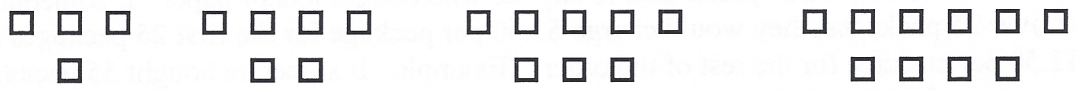


Figure 1 Figure 2 Figure 3 Figure 4

How many squares would be in the 50^{th} figure in the sequence?

   a. 52 squares
   b. 100 squares
   c. 102 squares
   d. 60 squares
   e. 72 squares

9. What value of x would make the inequality given below a true statement?

$$-6(4-7x) < 6x+12$$

   a. $x = 6$
   b. $x = 1$
   c. $x = 7$
   d. $x = 0$
   e. $x = 16$

10. The death rate in China last year was about 6.98 per 1000. If about 8,700,000 people died in China last year, approximately what is their population?

    a. The population is approximately 60,726.
    b. The population is approximately 607,260,000.
    c. The population is approximately 1,246,000,000.
    d. The population is approximately 12,460,000,000.
    e. The population is approximately 124,460,000,000.

11. I was on a treadmill walking 3.7 miles per hour. My goal was to walk 2.5 miles. Walking at that rate, how many minutes would it take me to meet my goal? (Round to the nearest minute.)

    a. about 41 minutes
    b. about 16 minutes
    c. about 9 minutes
    d. about 89 minutes
    e. about 24 minutes

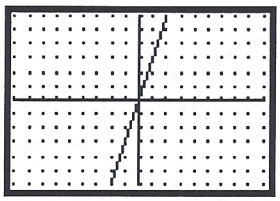
12. The discount store offered a special deal to anyone who bought lots of paper. If someone bought over 25 packages, they would charge $3.50 per package for the first 25 packages and then $2.50 per package for the rest of the order. (Example: If someone bought 35 packages, they would pay $3.50 each for the first 25 packages and $2.50 each for the last 10 packages for a total of $112.50). The Parent-Teacher organization spent $345 on paper for the school so that each teacher could have 4 packages. How many teachers are at the school?

    a. 103 teachers
    b. 34.5 teachers
    c. 32 teachers
    d. 93 teachers
    e. 26 teachers

13. Larry bought 2 Biggie Burgers, 1 Lemon Squirt, and 1 Sweet Pie. Before tax, Larry's total was $7.56. Liz got 1 Biggie Burger and 1 Lemon Squirt. Liz's total, before tax, was $3.98. Lynn bought 2 Sweet Pies and paid $1.98 before taxes. How much does a Biggie Burger cost?

    a. A Biggie Burger costs $1.60.
    b. A Biggie Burger costs $1.89.
    c. A Biggie Burger costs $1.99
    d. A Biggie Burger costs $2.49
    e. A Biggie Burger costs $2.59

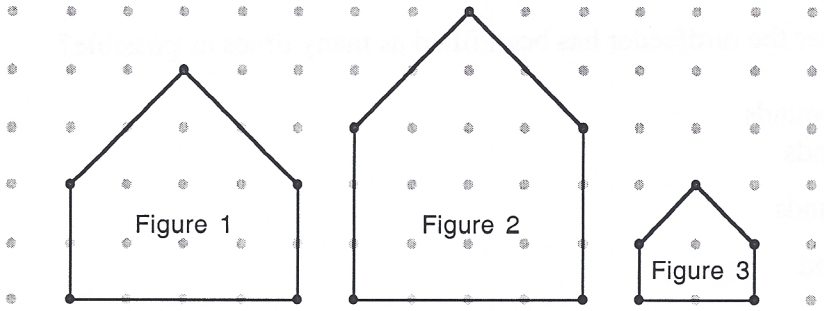
14. The graph of y = 3x is shown below.



How would the graph of y = 2x + 5 be different from this graph?

a. The only difference is that the line would be less steep.
b. The line would be less steep and it would be shifted down 5 units.
c. The line would be more steep and it would be shifted down 5 units.
d. The line would be less steep and it would be shifted up 5 units.
e. The only difference is that the line would be shifted up 5 units.

15. Which statement is true about the figures shown below?

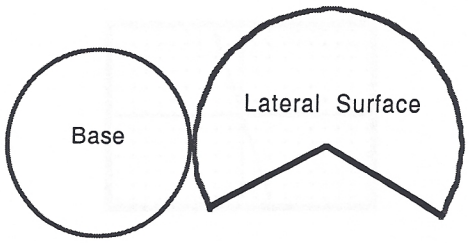


a. Figure 1 is similar to Figure 2, but Figure 1 is not similar to Figure 3.
b. Figure 1 is not similar to Figure 2, but Figure 1 is similar to Figure 3.
c. Figure 1 is similar to both Figure 2 and to Figure 3.
d. Figure 1 is not similar to Figure 2, but Figure 2 is similar to Figure 3.
e. No two of the figures are similar to each other.

16. Triangle ABC is an obtuse isosceles triangle. The measure of angle A is 35°. Angle B is an obtuse angle. What is the measure of angle C?

a. The measure of angle C is 110°.
b. The measure of angle C is 35°.
c. The measure of angle C is 145°.
d. The measure of angle C is 55°.
e. There is not enough information given to determine the measure of angle C.

17. The net for a cone is shown below.



The base is a circle with radius 4 cm. The lateral surface is 240° sector with radius 6 cm. What is the surface area of the cone?

a. 52π square centimeters
b. 32π square centimeters
c. 20π square centimeters
d. 16π square centimeters
e. 40π square centimeters

18. It takes $2\frac{2}{3}$ pounds of birdseed to fill a birdfeeder. How much birdseed is left over in a 25-pound bag after the birdfeeder has been filled as many times as possible?

a. 0.38 pounds
b. 9 pounds
c. $\frac{3}{8}$ pounds
d. 1 pound
e. $1\frac{1}{3}$ pounds

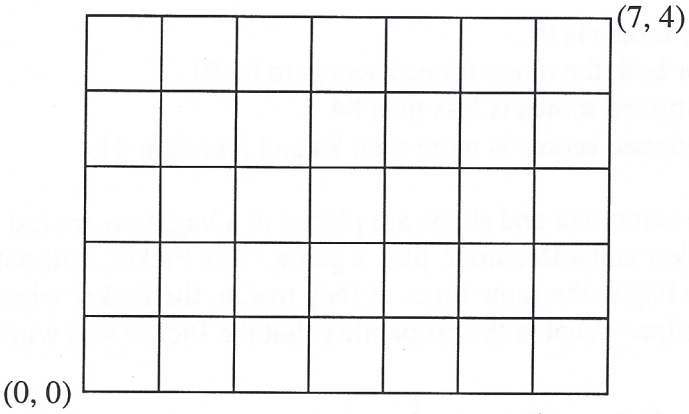
19. On a treadmill I walked at 3.7 miles per hour for 30 minutes, and then I walked 10 more minutes at a "cool-down" pace. If my total distance walked was 2.25 miles, what is the speed of my "cool-down" pace?

a. 0.4 miles per hour
b. 4 miles per hour
c. 2.4 miles per hour
d. 2 miles per hour
e. 1.85 miles per hour

20. A rectangular box has a volume of 750,000 cubic centimeters. It is 1 meter wide and 1.5 meters long. How tall is the box?

a. 0.5 meter
b. 5 meters
c. 50 meters
d. 500 meters
e. 5000 meters

21. On the grid shown below the lower left corner has coordinates (0, 0). The upper right corner has coordinates (7, 4). A rhombus is drawn on the grid with vertices at (1, 2), (4, 3), (7, 2), and (4, 1). If the distance from (0, 0) to (1, 0) is 1 centimeter and the distance from (0, 0) to (0, 1) is 1 centimeter, what is the area of the rhombus?

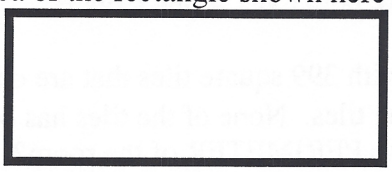


a. 9 square centimeters
b. 8 square centimeters
c. 7 square centimeters
d. 6 square centimeters
e. 5 square centimeters

22. In an isosceles trapezoid the two sides that are not parallel are congruent. An isosceles trapezoid has one angle whose measure is 48°. What are the measures of the other three angles?

a. All angles would have measure of 48°.
b. There would be one more 48° angle but the measures of the other two angles are impossible to determine.
c. There would be one more 48° angle and two 90° angles.
d. There would be one more 48° angle and two 42° angles.
e. There would be one more 48° angle and two 132° angles.

23. Approximately what is the area of the rectangle shown here in square centimeters?



a. 25 square centimeters
b. 10 square centimeters
c. 5 square centimeters
d. 20 square centimeters
e. 2 square centimeters

24. Eleven students took a 100-point test. The median of their scores was 91. Here are nine of the scores: 100, 100, 100, 96, 90, 90, 90, 86, 86. What statement must be true about the test scores?

    a. No one made 91.
    b. At least one of the scores is 91.
    c. It is impossible for both the unmentioned scores to be 91.
    d. One of the unmentioned scores is less than 84.
    e. One of the unmentioned scores is more than 84 and less than 91.

25. Three buttons that are the same size and shape are placed in a bag, two are red and one is green. Two people, a Picker and a Recorder, play a game. The Picker, without looking, draws two buttons out the bag at the same time. If they match, the Picker wins. If they do not match, the Recorder wins. What is the probability that the Picker will win?

    a. The probability the Picker will win is $\frac{1}{2}$.
    b. The probability the Picker will win is $\frac{2}{3}$.
    c. The probability the Picker will win is $\frac{1}{3}$.
    d. The probability the Picker will win is $\frac{1}{6}$.
    e. The probability the Picker will win is 0.

26. One hundred people at the mall were asked to tell what kinds of soft drinks they had drunk in the last two days. Fifty six people said they had drunk Cola A. Sixty one people said they had drunk Cola B. What must be true about the group of people?

    a. Exactly 17 people drank both Cola A and Cola B.
    b. At least 17 people drank both Cola A and Cola B.
    c. Everyone drank either Cola A or Cola B or both.
    d. There were no people who drank neither Cola A nor Cola B.
    e. Exactly five people drank both Cola A and Cola B.

27. A rectangular floor is covered with 399 square tiles that are one foot long on each side. There are no gaps or overlapping tiles. None of the tiles has been cut. The floor is 2 feet wider than it is long. What is the PERIMETER of the room?

    a. 40 feet
    b. 80 feet
    c. 64 feet
    d. 128 feet
    e. 399 feet

28. A, B, C, D, and E represent 0, 1, 2, 4, or 8 (not necessarily in that order). Each letter represents exactly one of the numbers. The following equations are true.

$$C \bullet A = C$$
$$E + E = A$$
$$D \div E = A$$
$$B \bullet B = B$$

Which letter represents 4?

a. A represents 4.
b. B represents 4.
c. C represents 4.
d. D represents 4.
e. E represents 4.

29. A group of n children are evenly spaced around a circle. They are numbered sequentially around the circle from 1 to n. Number 6 and number 23 are standing at opposite ends of a diameter of the circle. How many students are standing around the circle?

a. 17 children
b. 20 children
c. 21 children
d. 34 children
e. 66 children

30. In 2002, the U. S. mint produced 6,953,255,000 pennies. Each penny weighs 2.5 grams, and 2.5% of each penny is copper. The rest of the penny is zinc. How much copper was used in 2002 to produce pennies?

a. Approximately 434,579 kilograms
b. Approximately 4,345,790,000 kilograms
c. Approximately 43.4579 kilograms
d. Approximately 434.579 kilograms
e. Approximately 4,3457,900 kilograms