~~2000~~ SIXTH GRADE MATHEMATICS COMPETITION

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE

MIDDLE TENNESSEE STATE UNIVERSITY
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UNIVERSITY OF TENNESSEE AT MARTIN
MARTIN, TENNESSEE

Sixth Grade Test
~~2000~~
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. Find the number of terms in the sequence:
    7, 11, 15, 19, . . . , 203

    a) 29
    b) 203
    c) 5
    d) 50
    e) 49

2. Joe and Janice ordered a large pizza that had been cut into
    equal-sized pieces. Joe ate one half of the pizza and Janice ate
    one fourth of it. If there were 5 pieces left, how many pieces
    were there to begin with?

    a) 16
    b) 20
    c) 24
    d) 12
    e) 28

3. In the picture below, the horizontal and vertical distance
   between two dots is one centimeter. Find the area of the figure
    drawn.
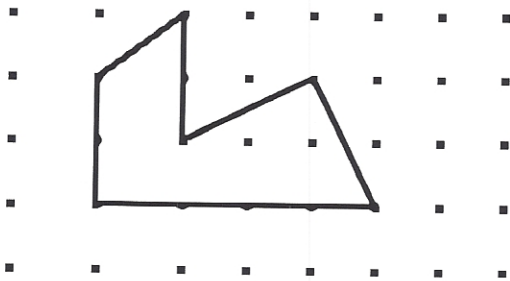
    a) 6.5 sq. cm
    b) 10.5 sq. cm
    c) 12.5 sq. cm
    d) 5.5 sq. cm
    e) 8.5 sq. cm

4. A school has 40 teachers. Each teacher teaches 4 classes. Each class has 30 students and 1 teacher. Each student takes 5 classes. How many students does the school have?

a) 4800
b) 1200
c) 960
d) 1500
e) 1000

5. If the radius of each of the smaller semicircles is 1 unit, what is the area of the shaded region of the larger semicircle?
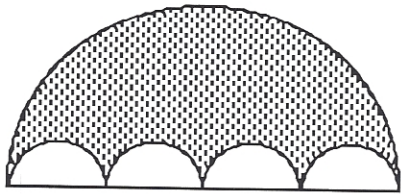
a) 16π sq. units
b) 4π sq. units
c) 6π sq. units
d) 64π sq. units
e) 12 sq. units

6. One ball is drawn from a box containing 4 white balls, 7 red balls and 5 blue balls. What is the probability that the ball is not red?

a) $\dfrac{7}{16}$

b) $\dfrac{9}{16}$

c) $\dfrac{1}{4}$

d) $\dfrac{5}{16}$

e) $\dfrac{11}{16}$

7. The letter "A" represents the units digit in the five digit number 15,72A. What is the value of A if nine divides the number?

a) 3
b) 4
c) 6
d) 9
e) 7

8. A merchant advertises that every item in his store is sold at 25% off the regular price. If he wishes to sell a dress for $135, what price should he mark as the regular price?

a) $180
b) $97.50
c) $520
d) $205
e) $100

9. A survey was conducted to find out what kinds of ice cream the school should sell in the cafeteria. Thirty-five students completed the survey. The survey listed vanilla, chocolate, and raspberry. Students were asked to check all the flavors they liked.

15 students checked at least chocolate.
13 students checked at least vanilla.
10 students checked at least raspberry.
8 checked at least both chocolate and vanilla.
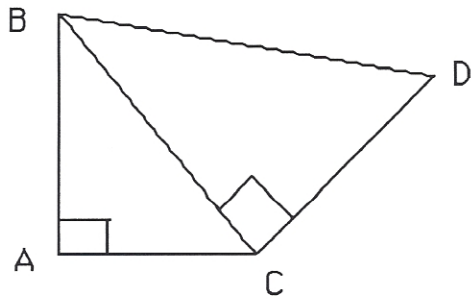7 checked at least both vanilla and raspberry.
4 checked at least both chocolate and raspberry.
2 checked all three.

How many students did not like any of these flavors?

a) 63
b) 28
c) 7
d) 21
e) 14

10. This figure is not necssarily drawn to scale. If AB = 3, angles A and BCD are right angles, the measure of angle ABC is 30°, and the measure of angle D is 45°, what is BD?

a) $\sqrt{3}$

b) $2\sqrt{3}$

c) $\dfrac{\sqrt{3}}{2}$

d) $\dfrac{\sqrt{2}}{3}$

e) $2\sqrt{6}$

11. Some of the factors of a locker number are known to be 3, 4, and 5. If there are exactly nine additional factors for a total of twelve, what is the locker number?

a) 180

b) 60

c) 120

d) 240

e) 480

12. Five of the six sides of a cube are marked with 1, 2, 3, 4, and 5. The sixth side is blank. Five sides of another cube are marked 1, 2, 3, 5, and 6. The other side is blank. What is the probability of rolling a sum of 7 on a throw of this pair of cubes?

a) $\dfrac{1}{6}$

b) $\dfrac{1}{9}$

c) 0

d) $\dfrac{1}{7}$

e) $\dfrac{1}{4}$

13. Which of the following has the least product?

a) 0.010 x 0.002
b) 0.0100 x 0.20
c) 0.01 x 0.0002
d) 0.1 x 0.2
e) 0.01 x 0.02

14. Which of the following is true for the diagonals of some but not all rectangles?

a) They bisect each other.
b) Each diagonal divides the rectangle into two congruent triangles.
c) They are congruent.
d) They form 2 pairs of vertical angles.
e) They are perpendicular.

15. What is the average speed of a car (in miles per hour) that travels 84 miles in 45 minutes?

a) 63 mph
b) 84 mph
c) 112 mph
d) 45 mph
e) 100 mph

16. A square is inscribed in a circle of radius 3 cm. What is the area of the square?

a) 18 sq. cm
b) 9 sq. cm
c) 36 sq. cm
d) 6 sq. cm
e) 12 sq. cm

17. What is the smallest of the three consecutive natural numbers whose sum is 321?

a) 106
b) 107
c) 123
d) 108
e) 321

18. Find the measure of angle CBD given that ABCD is a trapezoid, the measure of angle BDC is 30 degrees and the measure of angle BCD is 40 degrees.
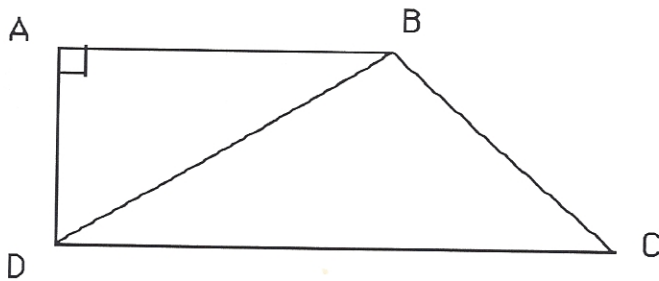
a) 30 degrees
b) 110 degrees
c) 40 degrees
d) 70 degrees
e) 120 degrees

19. A doll and a blanket cost $5.75. A blanket and a basket cost $8.25. A doll and a basket cost $7.00. What is the cost of a blanket?

a) $2.25
b) $3.50
c) $8.25
d) $6.50
e) $7.00

20. A large piece of wire weighs 40 pounds. If the wire weighs 0.2 pounds per foot, how long is the wire?

a) 40 ft.
b) 100 ft.
c) 200 ft.
d) 400 ft.
e) 2000 ft.

21. Mary sold one fourth of her doll collection. Of her remaining dolls one third are boy dolls. What fraction of her remaining dolls are girl dolls?

a) $\dfrac{3}{4}$

b) $\dfrac{1}{12}$

c) $\dfrac{1}{2}$

d) $\dfrac{2}{12}$

e) $\dfrac{2}{3}$

22. What is the next element in this sequence?
   1, 16, 81, 256, . . .

a) 512
b) 748
c) 1024
d) 625
e) 1296

23. How many of the first 100 natural numbers ($1 \leq n \leq 100$) are neither multiples of 3 nor multiples of 5?
   a) 47
   b) 50
   c) 53
   d) 45
   e) 25

24. My car traveled 310 miles using 9.9 gallons of gas. The price of gas is $1.65 per gallon. Which is the best estimate of the cost of a 625-mile trip?
   a) $33
   b) $54
   c) $19
   d) $48
   e) $13

25. Mary looks at John every 50 seconds. John looks at Mary every 12 seconds. They just looked at each other at the same time. How long will it be before they look at each other at the same time again?

   a) 100 sec.
   b) 150 sec.
   c) 300 sec.
   d) 60 sec.
   e) 120 sec.

26. A box contains the letters M, A, D. Two letters are drawn, one at a time and the result recorded. The draws are made without replacement. What is the probability that D and A were drawn in that order?

   a) 1

   b) $\dfrac{1}{7}$

   c) $\dfrac{1}{6}$

   d) $\dfrac{1}{4}$

   e) 0

27. The points A, B, C, and D lie on the same line. The distance from C to D is 60 miles. The distance from B to C is three fourths of the distance from C to D. The distance from A to B is two thirds of the distance from B to C. What is the distance from A to B?

a) 30 miles
b) 45 miles
c) 40 miles
d) 25 miles
e) 120 miles

28. There are approximately 2.5 cm in 1 inch. Which of the following amounts is the best estimate of the area of a square that is 2 inches on each side?

a) 25 sq cm
b) 12.5 sq cm
c) 250 sq cm
d) 125 sq cm
e) 36 sq cm

29. If six people can paint a house in 4 hours, how long will it take for 8 people to paint the same house? (Assume that everyone works the whole time at the same rate.)

a) 2 hrs.
b) 4 hrs.
c) 1 hr.
d) 3 hrs.
e) 2.5 hrs.

30. Which of the following is equivalent to $(8x - 9) - (3x + 7)$?

a) $11x - 2$
b) $5x + 16$
c) $11x + 2$
d) $5x - 2$
e) $5x - 16$

31. Six teams are in a basketball league. If each team played 2 games with each other team, how many games were played?

a) 60
b) 30
c) 36
d) 72
e) 15

32. A rectangular region is formed from 9 rows of 5 small squares. How many small squares do not have an edge on the perimeter of the rectangle?

a) 21
b) 35
c) 36
d) 27
e) 25

33. $3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ $3^5 = 243$
What digit will be in the ones position in 3^{1997}?

a) 3
b) 9
c) 7
d) 1
e) 6

34. Adult tickets for a play cost $6 and student tickets cost $4. The ratio of adult tickets sold to student tickets sold is 1:3. Which of the following is a possible value for the total revenue from the tickets sold?

a) $5200
b) $3000
c) $2800
d) $2700
e) $2600

35. Three fourths of the members of the math club are wearing t-shirts. There are twelve members who are not wearing t-shirts. How many members are there in the math club?

a) 6
b) 9
c) 16
d) 48
e) 36

36. During the first half of a basketball game the home team made 60% of their 40 field goal attempts. During the second half they made only 25% of 44 attempts. To the nearest 1%, what was their field goal percentage for the entire game?

a) 63%
b) 15%
c) 42%
d) 34%
e) 50%

37. On Valentine's Day a class of 15 students exchanged cards. If each student gave each other student one card, how many cards were exchanged?

a) 210
b) 225
c) 15
d) 30
e) 240

38. A club has 9 members. How many different 3 person committees can be formed from the members?

a) 504
b) 84
c) 9
d) 3
e) 27

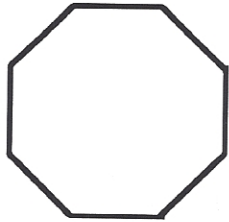39. The following geometric arrays suggest a sequence of numbers:

•••   ••••••   ••••••••
       ••••••   ••••••••
                 ••••••••

The next 2 numbers in this sequence are:

a) 18, 27
b) 48, 75
c) 36, 45
d) 36, 54
e) 27, 36

40.   How many lines of symmetry does the regular octagon shown here have?

a) 4
b) 6
c) 8
d) 10
e) 12