

2000

# 2000 SEVENTH GRADE MATHEMATICS COMPETITION

AUSTIN PEAY STATE UNIVERSITY  
CLARKSVILLE, TENNESSEE

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

Seventh Grade Test  
2000-2001  
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

	A	B	C	D	E
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
	A	B	C	D	E
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
	A	B	C	D	E
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ

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. 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

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



The next number in the sequence is:

- a) 27
- b) 48
- c) 28
- d) 24
- e) 45

3. 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

4. Mr. Peanut wants to mix peanuts that cost \$1.50 per pound with fancy nuts that cost \$3.00 per pound to produce a 50-pound mixture of nuts that costs \$1.89 per pound. How many pounds of fancy nuts should he use?

- a) 13 pounds
- b) 25 pounds
- c) 30 pounds
- d) 10 pounds
- e) 15 pounds

5. 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)  $\frac{7}{16}$

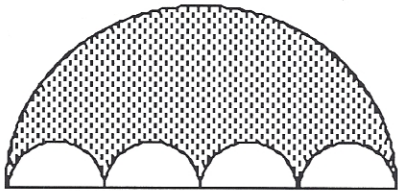
b)  $\frac{9}{16}$

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

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

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

6. All of the arcs in the figure are semicircles. What fractional part of the larger semicircular region is shaded?



a)  $12\pi$

b)  $\frac{1}{4}$

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

d)  $\frac{2}{3}$

e)  $\frac{3}{4}$

7. 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

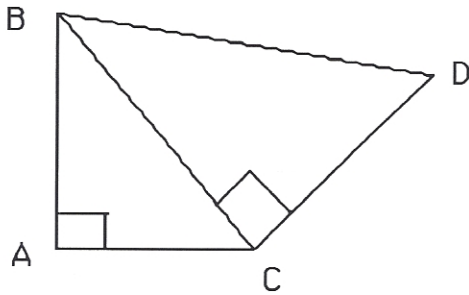
d) \$205

e) \$100

8. The letter "A" represents the units digit in the five digit number 15,71A. If A is greater than zero and 6 divides the number, what is the value of A?

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

9. This figure is not necessarily drawn to scale. If  $AB = 3$ , angles A and BCD are right angles, the measure of angle ABC is  $30^\circ$ , and the measure of angle D is  $45^\circ$ , what is BD?



- a)  $\sqrt{3}$
- b)  $2\sqrt{3}$
- c)  $\frac{\sqrt{3}}{2}$
- d)  $\frac{\sqrt{2}}{3}$
- e)  $2\sqrt{6}$

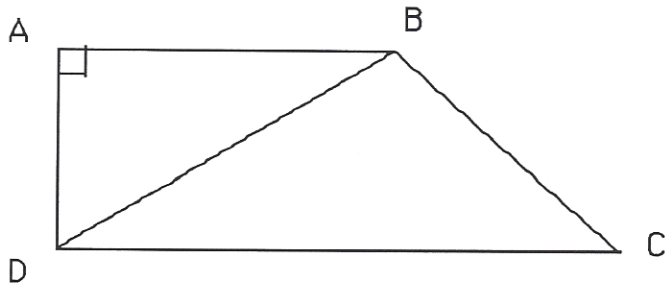
10. If the two lines whose equations are  $y = ex + f$  and  $y = gx + h$  are perpendicular then:

- a)  $e = g$  and  $f = h$
- b)  $e = g$  and  $f \neq h$
- c)  $e \cdot g = 0$
- d)  $e \cdot g = -1$
- e)  $e \cdot g = 1$

11. 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)  $\frac{1}{6}$
  - b)  $\frac{1}{9}$
  - c) 0
  - d)  $\frac{1}{7}$
  - e)  $\frac{1}{4}$
12. During the first half of a basketball game a team made 70% of their 30 field goal attempts. During the second half they made 30% of 50 attempts. What was their field goal percentage for the entire game?
- a) 50%
  - b) 45%
  - c) 40%
  - d) 35%
  - e) 55%
13. 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.

14. How many four digit numbers can be formed using the digits 2, 4, 6 and 8 if the ones digit must be a power of 2? No digit may be used more than once.
- a) 20
  - b) 9
  - c) 12
  - d) 18
  - e) 6
15. A square is inscribed in a circle of radius  $r$ . What is the area of the square?
- a)  $2r^2$
  - b)  $r^2$
  - c)  $4r^2$
  - d)  $2r$
  - e)  $4r$
16. On September 1, 1998, the mean (average) age of the 35 teachers at Fry Middle school was 44 years. On September 1, 1999, three teachers ages 65, 62 and 54 retired and were replaced by 2 teachers ages 25 and 32. To the nearest whole year, what was the mean age of the teachers on September 1, 1999?
- a) 37 years
  - b) 39 years
  - c) 40 years
  - d) 42 years
  - e) 43 years

17. Find the measure of angle CBD given that ABCD is a trapezoid, the measure of angle ABD 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

18. Seven red balls numbered 1 through 7 and five blue balls numbered 1 through 5 are placed in a bowl. If one ball is drawn at random, what is the probability that it is numbered 4 or is blue?

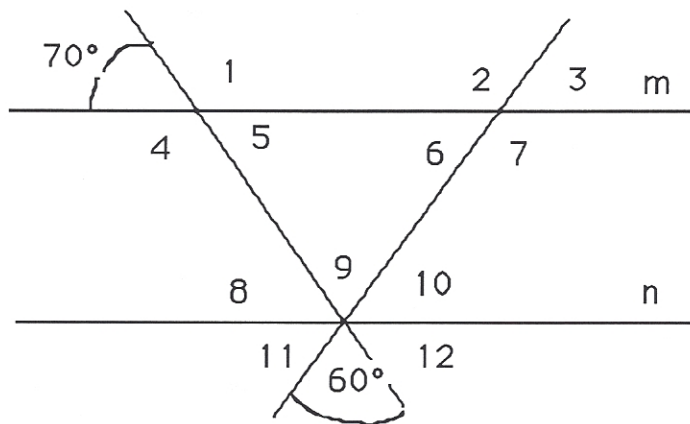
- a)  $\frac{5}{12}$
- b)  $\frac{1}{2}$
- c)  $\frac{7}{12}$
- d)  $\frac{3}{4}$
- e)  $\frac{1}{3}$



19. 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.

20. In the following picture lines  $m$  and  $n$  are parallel. Find the measure of the angle identified with the number 7.



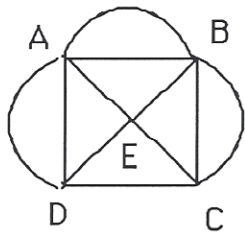
- a)  $120^\circ$
- b)  $125^\circ$
- c)  $130^\circ$
- d)  $135^\circ$
- e)  $140^\circ$

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

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



22. How many lines are determined by 7 points in a plane, no three of which lie on the same line?
- 7
  - 49
  - 42
  - 21
  - 18
23. 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?
- \$33
  - \$54
  - \$19
  - \$48
  - \$13
24. We want to trace the figure shown below without lifting the pencil in such a way that each edge of the figure is traced exactly once. (There are two edges connecting vertices A and B; one is straight and the other is curved.) It is permissible to visit a vertex more than once. Which of the statements is false?



- To trace this figure, if you start at A, you must end at B.
- If you start at B, you must end at A.
- It is not possible to trace this figure if you start at C, D or E.
- If you start at A or B, it is possible to trace this figure.
- It is possible to start at E and end at E.

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

a) 1

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

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

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

e) 0

26. Acme Auto Rental has three red Fords, four white Fords, and two black Fords. Acme also has six red Hondas, two white Hondas, and five black Hondas. If a car is selected at random for rental to a customer, what is the probability that it is white?

a)  $\frac{5}{11}$

b)  $\frac{4}{9}$

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

d)  $\frac{3}{11}$

f)  $\frac{9}{22}$

27. 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

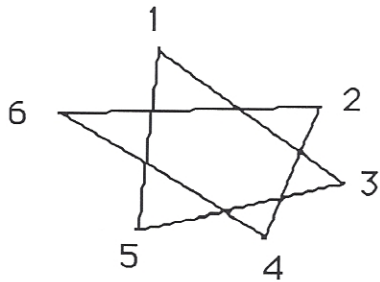
b) 12.5 sq cm

c) 250 sq cm

d) 125 sq cm

e) 36 sq cm

28. In the following six-pointed star, the sum of the measures of the interior angles located at 1, 2, 3, 4, 5 and 6 is:

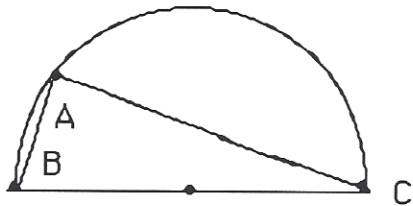


- a)  $180^\circ$
- b)  $90^\circ$
- c)  $270^\circ$
- d)  $360^\circ$
- e) Because the star is irregular it is not possible to determine the sum of the interior angles.

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

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

30. The following picture (not necessarily drawn to scale) shows angle A inscribed in a semicircle. If the circle has radius two, and the length of segment AB is two, what is the length of segment AC?



- a)  $2\sqrt{3}$
- b)  $2\sqrt{2}$
- c) 2
- d)  $2\sqrt{5}$
- e) 4

31. A rectangular region is formed from 9 rows with 5 small squares per row. 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
32. Sam's Hardware store has a number of bicycles and tricycles for sale. There are 25 seats and 60 wheels in all. How many bicycles does he have for sale?
- a) 25
  - b) 10
  - c) 7
  - d) 15
  - e) 20
33. 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
34. What is the sum of the first 50 odd positive integers  $(1+3+5+7+\dots+99)$ ?
- a) 2500
  - b) 5000
  - c) 100
  - d) 250
  - e) 225

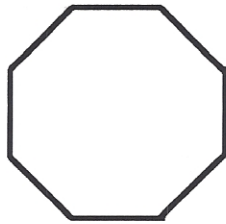
35. Four students are walking down the hall at school in this order: Beth, Tim, Mike, and Sue. The distance from Beth to Sue is 74 feet. Mike is 2 feet closer to Sue than he is to Tim. It is twice as far from Beth to Tim as it is from Mike to Sue. Mike is 56 feet behind Beth. How far is Tim from Mike?
- a) 2 feet
  - b) 18 feet
  - c) 20 feet
  - d) 27 feet
  - e) 36 feet
36. There are 108 Star Bangs in a jumbo bag. There are 72 Choco Yums in their largest size bag. You are giving candy away at the Pep Rally. You want to have the same number of Star Bangs as Choco Yums, but you do not want any leftover candy. What is the least number of bags of each kind of candy you should buy?
- a) 1 bag of each
  - b) 2 bags of Star Bangs and 3 bags of Choco Yums
  - c) 3 bags of Star Bangs and 2 bags of Choco Yums
  - d) 3 bags of Star Bangs and 4 bags of Choco Yums
  - e) 2 bags of Star Bangs and 4 bags of Choco Yums
37. 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
38. One of the tallest candles ever constructed was exhibited at the 1897 Stockholm Exhibition. If it cast a shadow 5 feet long at the same time that a pole 32 feet high cast a shadow 2 feet long, how tall was the candle?
- a) 32 ft.
  - b) 100 ft.
  - c) 75 ft.
  - d) 80 ft.
  - e) 95 ft.

39. The sequence of triangular numbers can be illustrated by arranging dots into triangular arrays. Below is a figure showing how the first 4 triangular arrays are formed. What is the eleventh triangular number?



- a) 11
- b) 25
- c) 33
- d) 55
- e) 66

40. The number of lines of symmetry for the regular octagon pictured is:



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