

1996 EIGHTH GRADE MATHEMATICS COMPETITION

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE

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

Eighth Grade Test
1996
Scoring Formula $4R - W + 40$

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DIRECTIONS:

This is a test of your competence in middle school mathematics. For each problem there are five 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 B C D E |
| a. | 0 | 1 ① ② ③ ● ⑤ |
| b. | 2 | A B C D E |
| c. | -1 | 2 ① ② ③ ④ ⑤ |
| d. | 1 | A B C D E |
| e. | none of the above | 3 ① ② ③ ④ ⑤ |

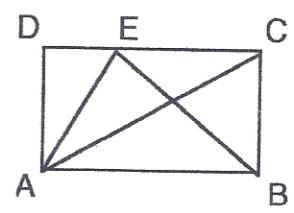
The correct answer is 1 which is d; so you should answer this problem by darkening the space on the answer sheet corresponding with this choice.

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.

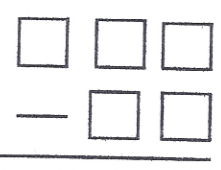
1. I am 10 years older than my sister. Ten years ago, she was 10. How old will I be in ten years?
- (a) 20
 - (b) 30
 - (c) 40
 - (d) 50
 - (e) 60
2. $5^6 \cdot 2^6 =$
- (a) 1,000
 - (b) 10^{12}
 - (c) 7^6
 - (d) 1,000,000
 - (e) 995
3. Jack had a bag of 128 apples. He sold 25% of them to Jill. Next he sold 25% of those remaining to June. Of those apples still in his bag, he gave the shiniest one to his teacher. How many apples did Jack have then?
- (a) 7
 - (b) 63
 - (c) 65
 - (d) 71
 - (e) 111
4. A rectangle whose sides have lengths which are integers has a perimeter of 36 inches. Which of the following could not be the area of the rectangle?
- (a) 17 square inches
 - (b) 60 square inches
 - (c) 65 square inches
 - (d) 72 square inches
 - (e) 80 square inches
5. Joe, Sally, Bob and Mary are to be seated in a row of 4 chairs. How many ways can this be done if Sally and Mary have to sit next to each other?
- (a) 16
 - (b) 12
 - (c) 8
 - (d) 6
 - (e) 4
6. If $a + b = 8$, then $4a + 4b - 7 =$
- (a) 1
 - (b) 5
 - (c) 9
 - (d) 25
 - (e) 57

7. In the rectangle below, the area of $\triangle ABE$ is 12 square units. What is the area of $\triangle ABC$?



- (a) 18 square units
- (b) 15 square units
- (c) 12 square units
- (d) 10 square units
- (e) 8 square units

8. When placing each of the digits, 2, 4, 5, 6, and 9 in exactly one of the boxes of this subtraction problem, what is the smallest difference possible?



- (a) 58
- (b) 123
- (c) 149
- (d) 171
- (e) 176

9. Points A, B, C, D lie on a line, as shown below. If $AC = 20$, $BC = 15$, and $AD = 30$, then $CD =$



NOTE: The diagram is not necessarily drawn to scale.

- (a) 5
- (b) 10
- (c) 15
- (d) 20
- (e) 25

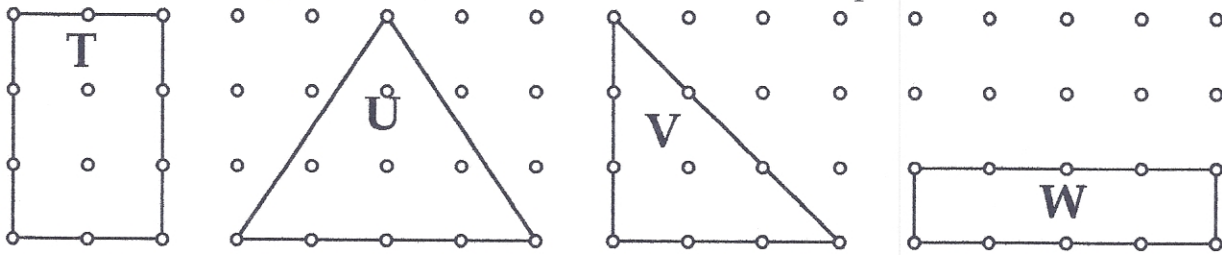
10. For $\triangle ABC$, $m \angle A = 55^\circ$ and $m \angle B = 67^\circ$, then $m \angle C =$

- (a) 55°
- (b) 56°
- (c) 57°
- (d) 58°
- (e) 63°

11. $43.416 \div 0.06 =$

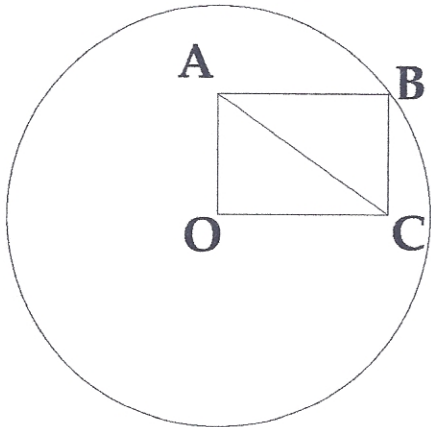
- (a) 7.236
- (b) 72.36
- (c) 723.6
- (d) 7236
- (e) 72,360

12. Which two figures have the same area but different perimeters?



- (a) T and U
- (b) T and V
- (c) T and W
- (d) U and V
- (e) V and W

13. O is the center of the circle. \overline{AC} is a diagonal of rectangle OABC. If $AC = 5$, what is the measure of the circle's diameter?



- (a) 10
- (b) $10\sqrt{2}$
- (c) 12
- (d) 5π
- (e) 25π

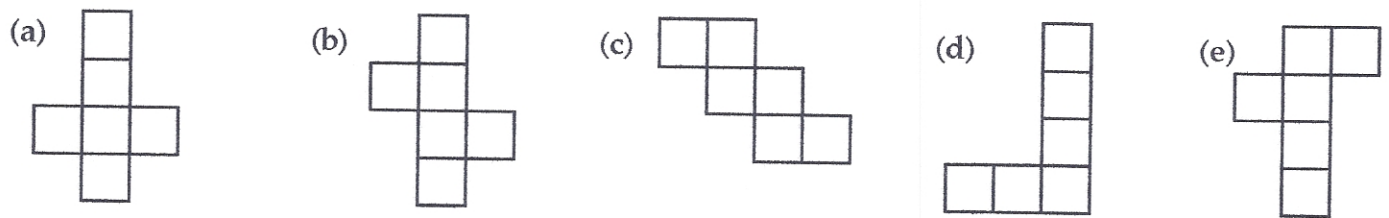
14. If $3a = 5b$, then $\frac{a}{b} =$

- (a) $\frac{3}{5}$
- (b) $\frac{3}{8}$
- (c) $\frac{5}{3}$
- (d) $\frac{8}{3}$
- (e) $\frac{5}{8}$

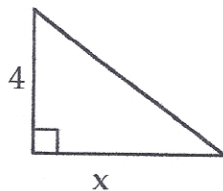
15. A tennis player burns 800 calories for each hour she is playing. How many calories does she burn if she plays 1 hour and 15 minutes?
- (a) 600
 - (b) 800
 - (c) 900
 - (d) 1000
 - (e) 1600

16. If January 1 falls on a Sunday, on what day will January 31 fall?
- (a) Sunday
 - (b) Monday
 - (c) Tuesday
 - (d) Wednesday
 - (e) Thursday

17. Which of the following would not fold up to make a cube?



18.



The area of the right triangle pictured above is 16 square units. Then $x =$

- (a) 4
 - (b) 6
 - (c) 8
 - (d) 10
 - (e) 12
19. For every two gidgets purchased at the regular price, you can buy a third gidget for 1¢. A total of 9 gidgets can be purchased for 45¢. What is the regular price of one gidget?
- (a) 5¢
 - (b) 6¢
 - (c) 7¢
 - (d) 8¢
 - (e) 9¢

20. I have twice as many dimes as nickels. The value of my nickels is \$2.10. What is the value of my dimes?

- (a) \$4.20
- (b) \$6.40
- (c) \$7.20
- (d) \$8.20
- (e) \$8.40

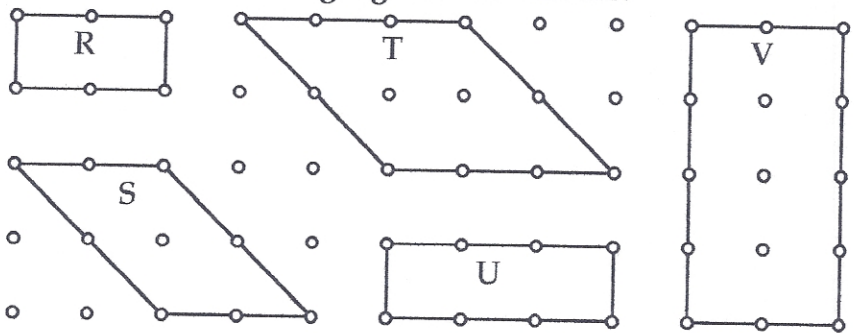
21. Which of the following could not be the lengths of the sides of a triangle?

- (a) 5 inches, 6 inches, and 7 inches
- (b) 5 inches, 8 inches, and 9 inches
- (c) 5 inches, 10 inches, and 10 inches
- (d) 5 inches, 10 inches, and 14 inches
- (e) 5 inches, 9 inches, and 14 inches

22. Jane bought two bottles of soda and a candy bar for \$1.40. Later she bought one bottle of soda and a candy bar for 90¢. What was the cost of one candy bar?

- (a) 35¢
- (b) 40¢
- (c) 45¢
- (d) 50¢
- (e) 55¢

23. Which of the following figures are similar?

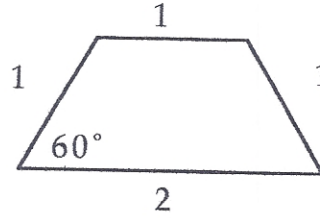
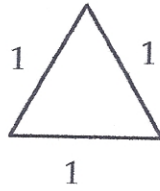


- (a) R and U
- (b) S and T
- (c) U and V
- (d) R and T
- (e) R and V

24. The difference of two positive integers is 6 and the difference of their squares is 48. What is the sum of the two integers.

- (a) 42
- (b) 21
- (c) 16
- (d) 8
- (e) 4

- 8-7
25. Twenty of the trapezoidal tiles shown below can cover the floor of a shower completely without overlapping. The shower floor can also be completely covered with the triangular tiles shown below without overlapping. How many of the triangular tiles are needed to cover the shower floor?



- (a) 60
(b) 40
(c) 36
(d) 24
(e) 12
26. Which fraction represents the greatest number?
- (a) $\frac{149}{200}$
(b) $\frac{301}{400}$
(c) $\frac{401}{600}$
(d) $\frac{597}{800}$
(e) $\frac{893}{1200}$
27. It's 60 miles from Ellendale to Jamestown. One car leaves Ellendale at 1:00 p.m. traveling at 50 miles per hour toward Jamestown. Another car leaves Jamestown at 1:00 p.m. traveling at 40 miles per hour toward Ellendale. When will the cars meet?
- (a) 1:30 p.m.
(b) 1:35 p.m.
(c) 1:40 p.m.
(d) 1:50 p.m.
(e) 2:00 p.m.
28. If each exterior angle of a regular polygon is 30° , then how many sides does the polygon have?
- (a) 3
(b) 6
(c) 9
(d) 12
(e) 18

29. Find the difference between the greatest and the second greatest numbers shown below:

$$\frac{1}{4}, \frac{2}{9}, \frac{1}{3}, \frac{1}{5}$$

(a) $\frac{2}{16}$

(b) $\frac{1}{15}$

(c) $\frac{1}{10}$

(d) $\frac{1}{12}$

(e) $\frac{1}{30}$

30. When a pail containing 40 nails is placed on a scale, the scale reads 475 grams. When the same pail containing only 20 nails is placed on the scale, it reads 395 grams. How much does the pail weigh?

(a) 315 grams

(b) 320 grams

(c) 325 grams

(d) 350 grams

(e) 380 grams

31. Suppose you toss a pair of dice and determine the product of the number of dots on each die. What is the probability that the resulting product is 15?

(a) $\frac{1}{36}$

(b) $\frac{1}{18}$

(c) $\frac{1}{12}$

(d) $\frac{1}{9}$

(e) $\frac{5}{36}$

32. How many natural numbers in the set $\{1, 2, 3, 4, \dots, 1000\}$ are perfect cubes?

(a) 8

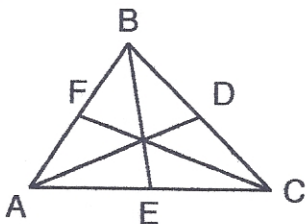
(b) 9

(c) 10

(d) 31

(e) 250

33. Triangle ABC has a perimeter of 48 units. \overline{AD} , \overline{BE} , and \overline{CF} are medians of the triangle. $BF = 7$ and $BD = 8$. Then $AE =$



- (a) 9
 (b) 15
 (c) 16.5
 (d) 18
 (e) 33
34. It is impossible for a triangle to be both
- (a) scalene and obtuse.
 (b) right and scalene.
 (c) right and isosceles.
 (d) obtuse and scalene.
 (e) right and equilateral.
35. Which of the following numbers is divisible by 12?
- (a) 3,000,000,342
 (b) 3,000,000,432
 (c) 3,000,000,234
 (d) 3,000,000,243
 (e) 3,000,000,423
36. A triangle with sides of length 5, 5, and 6 units has area t . A triangle with sides of length 5, 5, and 8 has area s . A rectangle with sides of length 3, 4, 3, and 4 has area r . Which of the following statements are true?
- (a) $t < s < r$
 (b) $t = s$ and $s < r$
 (c) $r < s < t$
 (d) $r = t$ and $t < s$
 (e) $t = s = r$
37. A rectangular garage is 8 yards long by 10 yards wide. A dog is tied to a 5-yard-long rope at the middle of the outside wall that is 8 yards long. What is the area of the region in which the dog can roam?
- (a) 13 square yards
 (b) 12.5π square yards
 (c) 13π square yards
 (d) 25.5π square yards
 (e) 40 square yards

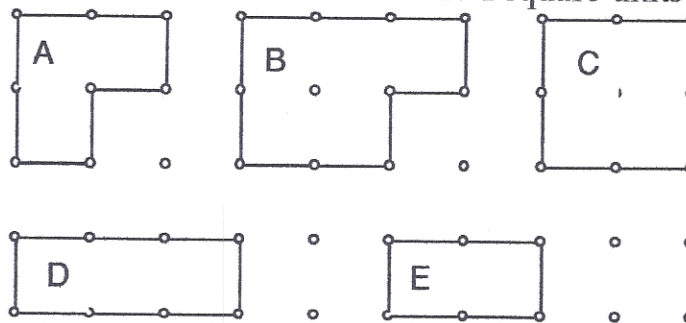
38.



The first four triangular numbers are 1, 3, 6, and 10. What is the ninth triangular number?

- (a) 22
- (b) 28
- (c) 36
- (d) 45
- (e) 55

39. One letter is chosen at random from the set {A, B, C, D, E}. Each letter represents one of the polygons shown below. What is the probability that the corresponding polygon has a perimeter greater than 7 units and an area less than 4 square units?



- (a) 0
- (b) $\frac{1}{5}$
- (c) $\frac{2}{5}$
- (d) $\frac{3}{5}$
- (e) $\frac{4}{5}$

40. The tops of a 13-foot ladder and a 15-foot ladder are braced against each other at a point 12 feet above the surface of a level floor. How far apart are the bottoms of the ladders?

- (a) 5 feet
- (b) 9 feet
- (c) $13\frac{1}{3}$ feet
- (d) 14 feet
- (e) 28 feet