

Pellissippi State

Middle School Mathematics Competition

Sponsored by: Oak Ridge Associated Universities

Sixth Grade

Scoring Formula: $4R - W + 30$

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.

Please use only capital letters on the answer sheet (A, B, C, D, E) and print neatly. This will more easily enable us to correctly grade your paper. If there is any question as to what letter an answer is, it will be marked wrong.

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. Additional room for you to work out problems is available on the back of each of the test booklet's pages.

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. A right rectangular prism has the following dimensions:
 height = 0.75 meters
 width = 2 meters
 length = 0.5 meters
 What is the volume of the prism in cubic decimeters?
 - a. 0.75 cubic decimeters
 - b. 7.5 cubic decimeters
 - c. 75 cubic decimeters
 - d. 750 cubic decimeters
 - e. 7500 cubic decimeters

2. Which of the following lists of numbers is in the correct order from least to greatest?
 - a. 3.01, 3.020, 3.1, 3.101
 - b. 3.01, 3.1, 3.101, 3.020
 - c. 3.101, 3.020, 3.01, 3.1
 - d. 3.020, 3.01, 3.1, 3.101
 - e. 3.1, 3.01, 3.101, 3.020

3. Sandy is 5 feet tall. She casts a shadow that is 9 feet long. She is standing next to a light pole that is casting a shadow that is 45 feet long. Let h represent the height of the light pole. Which equation accurately represents the situation?
 - a. $\frac{5}{45} = \frac{h}{9}$
 - b. $\frac{5}{9} = \frac{h}{45}$
 - c. $\frac{5}{9} = \frac{45}{h}$
 - d. $\frac{4}{5} = \frac{h}{45}$
 - e. $\frac{4}{9} = \frac{h}{45}$

4. You earn \$5.40 per hour at your job. You are promised to be given a 15% pay raise when you turn 14. What will be your hourly wage at that time?
 - a. \$5.55
 - b. \$6.00
 - c. \$6.25
 - d. \$6.21
 - e. \$8.10

5. What is the difference between the sum of $\frac{1}{2}$ and $\frac{1}{3}$ and the product of $\frac{1}{2}$ and $\frac{1}{3}$?
 - a. 0
 - b. $\frac{1}{6}$
 - c. $\frac{2}{3}$
 - d. $\frac{5}{6}$
 - e. $\frac{11}{12}$

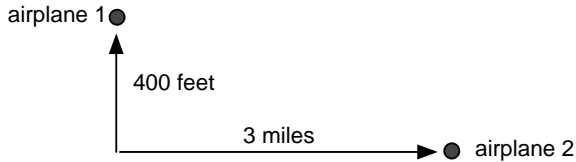
6. Which expression is NOT an appropriate way to compute the product of 75×16 ?
 - a. $(75 \times 10) + (75 \times 6)$
 - b. $(70 \times 10) + (5 \times 6)$
 - c. $(70 \times 16) + (5 \times 16)$
 - d. $3 \times (25 \times 4) \times 4$
 - e. $(75 \times 4) \times (16 \div 4)$

7. Lynn left at 4:00 pm to get to the game, which was 75 miles away, by 6:00 pm. After traveling one hour and fifteen minutes, Lynn still had traveled only 30 miles because of a traffic jam. What must Lynn's average speed be for the rest of the trip to arrive at the game at 6:00 pm?
 - a. 1 mile per hour
 - b. 30 miles per hour
 - c. 45 miles per hour
 - d. 50 miles per hour
 - e. 60 miles per hour

8. I have 6 cups of flour. One recipe of cookies calls for $1\frac{2}{3}$ cups of flour. After I make as many whole recipes of cookies as possible, how much flour will be left over?

- a. 0.35 cups of flour
- b. 0.6 cups of flour
- c. 1 cup of flour
- d. 0.33333 cups of flour
- e. 0.66666 cups of flour

9. Two planes came too close to each other in flight. The vertical distance between the two planes was 400 feet. The horizontal distance between the two planes was 3 miles. How far apart were the planes?



- a. between 400 and 500 feet apart
- b. between 1 and 2 miles apart
- c. between 2 and 3 miles apart
- d. between 3 and 4 miles apart
- e. between 4 and 5 miles apart

10. The following table describes a group of musicians and what instrument they play.

	flute	piano
male	6	3
female	2	4

If one musician is selected at random, find the probability that the musician is female or not playing the flute.

- a. $\frac{11}{15}$
- b. $\frac{3}{5}$
- c. $\frac{4}{15}$
- d. $\frac{4}{5}$
- e. $\frac{13}{15}$

11. A cubic centimeter is what percent of a cubic meter?

- a. 0.000001%
- b. 0.0001%
- c. 0.001%
- d. 0.01%
- e. 0.1%

12. Two fractions are greater than 0 and have a sum greater than $\frac{1}{2}$ but less than 1. Which statement CANNOT be true about two numbers?

- a. Both are less than $\frac{1}{3}$.
- b. Both are proper fractions.
- c. One of the numbers is less than $\frac{1}{100}$.
- d. One of the numbers is greater than $\frac{999}{1000}$.
- e. Both of the numbers are greater than $\frac{582}{1160}$.

13. Mrs. Price made a stem and leaf plot to show the high temperature for the school days in December. Use this information to determine the median for the temperature data.

Daily High Temp (°F) of School Days in December

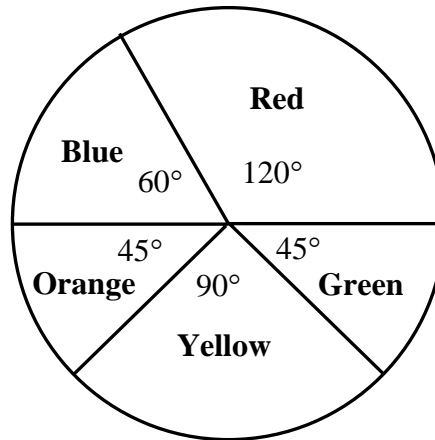
<i>Stem</i>	<i>Leaf</i>
4	1247789
5	4678
6	25
7	367

- a. 47 b. 49 c. 54 d. 55 e. 56

14. A spinner has five sections with the following five colors and central angles: Blue, 60°; Red, 120°; Green, 45°, Yellow, 90°, and Orange, 45°.

What is the probability that the spinner will land on blue or green after one spin?

- a. $\frac{2}{5}$
 b. $\frac{7}{24}$
 c. $\frac{1}{6}$
 d. $\frac{17}{24}$
 e. $\frac{7}{12}$



15. One and one-fourth cups of flour weighs 142 grams. How much would two cups of flour weigh?

- a. 177.5 grams b. 284 grams c. 113.6 grams d. 355 grams e. 227.2 grams

16. The following table gives information about the vehicles driven by the townspeople of Mayberry. (Assume each person drives exactly one vehicle.) One person is selected at random. Find the probability that the person does not drive a truck.

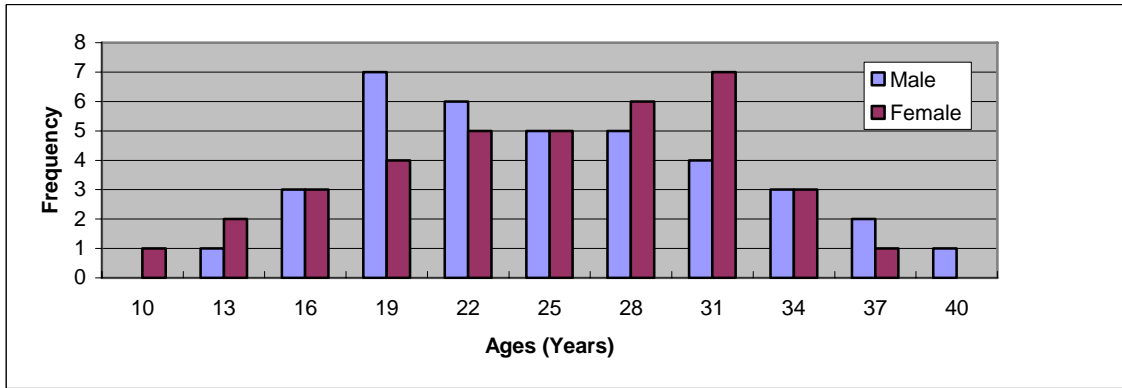
	Male	Female
Car	8	17
Truck	25	6
S.U.V.	12	15

- a. $\frac{31}{83}$ b. $\frac{52}{83}$ c. $\frac{56}{83}$ d. $\frac{58}{83}$ e. $\frac{60}{83}$

17. All the sides of rhombus ABCD are 6 cm long. All the sides of rhombus HIJK are 10 cm long. Angle A has a measure of 80° . Angle H has a measure of 100° . Which statement CANNOT be true about the two figures?

- a. The two figures are not similar.
- b. Angle B is congruent to angle J.
- c. Rhombus ABCD is similar to rhombus IJKH.
- d. Angle A is congruent to angle K.
- e. The ratio of the area of rhombus ABCD to the area of rhombus HIJK is $\frac{36}{100}$.

18. The following chart depicts the ages of a group of 37 males and 37 females. Which statement is true?

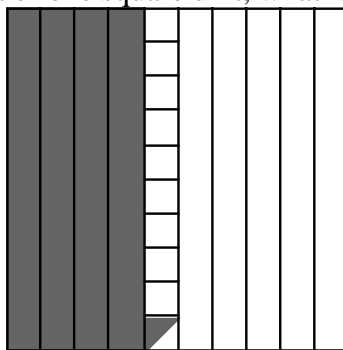


- a. The mode of the female ages is 7.
- b. The range of the male ages is greater than the range of the female ages.
- c. The mean male age is equal to the mean female age.
- d. The median male age is equal to the median female age.
- e. There are 19 males that are 7 years old.

19. Two numbers, a and b , have a greatest common factor of 24. Neither number is 24. Which of the following MUST be true?

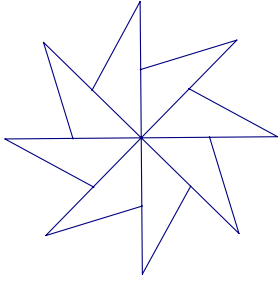
- a. a is even and b is odd.
- b. a is a multiple of 16.
- c. b is a multiple of 9.
- d. a and b have a common factor of 12.
- e. The least common multiple of a and b is 60.

20. If the large square has an area of one square unit, what is the area of the shaded region?



- a. 0.45 square units
- b. 0.41 square units
- c. 0.401 square units
- d. 0.405 square units
- e. 0.402 square units

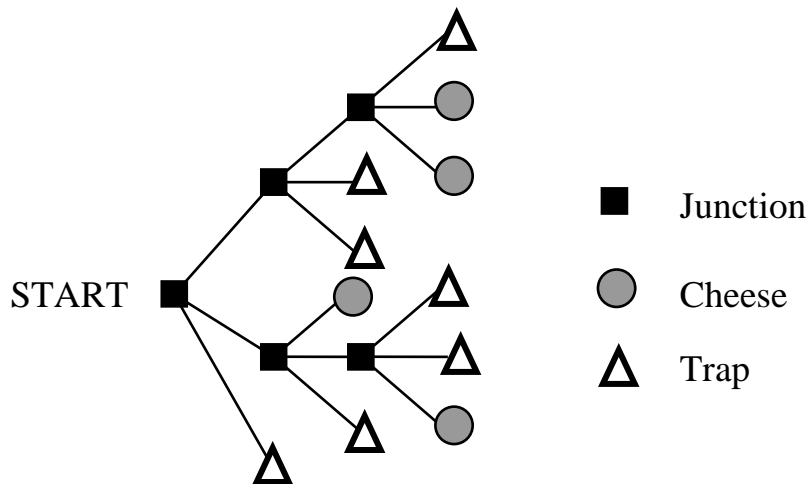
25. Which statement is true about the figure shown here?



- It has both line symmetry and rotational symmetry.
- It has no symmetry.
- It has exactly one line of symmetry, but it does not have rotational symmetry.
- It has rotational symmetry but not line symmetry.
- It has four lines of symmetry.

26. A mouse goes through the maze below from left to right – beginning at START and ending at either a piece of cheese or a mouse trap. At each junction in the maze, the mouse randomly chooses one of three different routes. Find the probability that the mouse gets a piece of cheese.

- $\frac{2}{9}$
- $\frac{4}{11}$
- $\frac{5}{6}$
- $\frac{7}{9}$
- $\frac{7}{11}$



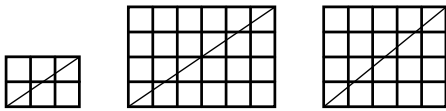
27. Cereal A has 30% less sugar than Cereal B. One cup of cereal A has 14 grams of sugar. How much sugar does one cup of Cereal B have?

- 20 grams
- 18.2 grams
- 23.8 grams
- 44 grams
- 16 grams

28. Triangle ABC is an isosceles triangle. The measure of angle A is 15° . Which statement CANNOT be true about the triangle?

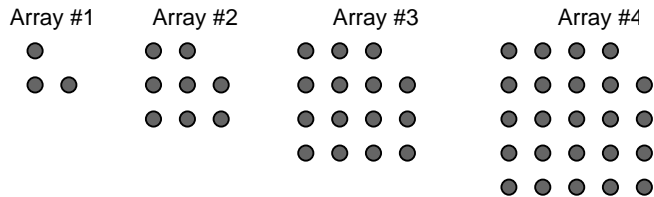
- a. It is an acute triangle.
- b. It is an obtuse triangle.
- c. The measure of angle B is 150° .
- d. The measure of angle B is 82.5° .
- e. The side opposite the 15° angle is the longest side.

29. Rectangles are made of small congruent squares. A diagonal drawn from the bottom left to the top right of a rectangle cuts through the interior of some of the squares. (Count only squares for which the diagonal goes through the interior of the square—not just the vertex.) For a 2×3 , the diagonal goes through 4 squares. For a 4×6 it goes through 8. For a 4×5 it goes through 8. How many squares would a diagonal of a 32×40 rectangle go through?



- a. 71
- b. 68
- c. 65
- d. 64
- e. 60

30. The following is a sequence of arrays. How many dots will be in array # 100?



- a. 10,000
- b. 9,999
- c. 10,201
- d. 10,200
- e. 9,801