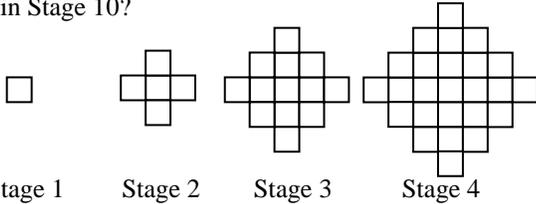


MATHCOUNTS
Team Round
1998-1999

1. In a plane, 10 lines intersect such that no 3 lines meet at the same point. What is the maximum number of regions created by the lines? 1. _____

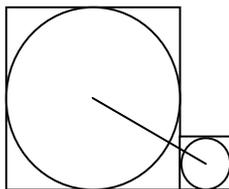
2. The lengths of the diagonals of a rhombus are 6 inches and 8 inches. If a circle is inscribed in the rhombus, how many inches are in its circumference? Use 3.14 for π as an approximation for π , and express your answer as a decimal to the nearest tenth. 2. _____

3. At each stage a new square is drawn on each side of the perimeter of the figure in the previous stage. How many unit squares will be in Stage 10? 3. _____



4. In the first two-mile race, Kendi beat Jerry by $\frac{1}{3}$ -mile, and in the second two-mile race, Jerry beat Micah by $\frac{1}{2}$ -mile. If Kendi and Micah run a third two-mile race, and all three runners run at the same speed in every race, By how many miles will Kendi beat Micah? Express your answer as a common fraction. 4. _____

5. The areas of two adjacent squares are 256 square inches and 16 square inches, respectively, and their bases lie on the same line. What is the number of inches in the length of the segment that joins the centers of the two inscribed circles? Express your answer as a decimal to the nearest tenth. 5. _____

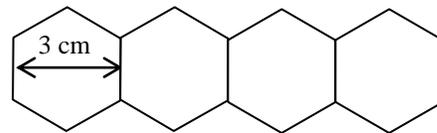


6. The sequence of numbers a_1, a_2, a_3, \dots is defined by $a_1 = 7, a_2 = -6$, and $a_n = a_{n-1} - a_{n-2}$ for $n > 2$. What is the sum of the first 2000 terms of the sequence? 6. _____

7. Two runners begin running in the same direction on a quarter-mile track. The first runner began five feet ahead of the second runner. The first runner's pace is 6 minutes per mile, while the second runner's pace is 8 minutes per mile. Both runners continue at their respective paces for 119 minutes. How many times will the first runner pass the second runner? 7. _____

8. Each day, Ms. Vasquez divides her 15 students into groups of 3. What is the probability that Lisa, Frank, and Maria will be in the same group today? Express your answer as a common fraction. 8. _____

9. Regular hexagons are placed side-by-side in a continuous pattern. What is the maximum number of congruent hexagons that can be placed side-by-side such that the perimeter of the resulting figure is less than 100 cm? 9. _____



10. Right $\triangle ABC$ has legs measuring 8cm and 15 cm. The triangle is rotated about one of its legs. What is the number of cubic centimeters in the maximum possible volume of the resulting solid? Express your answer in terms of π . 10. _____