



Try these problems before watching the lesson.

1. How many different five-letter “words” can be formed from the letters in the word “HOOPS” if the two O’s must be consecutive?
2. How many four-digit numbers have exactly one 0?
3. When 3 lines are drawn in a plane, what is the maximum number of intersections that can occur?
4. When 4 lines are drawn in a plane, what is the maximum number of intersections that can occur?
5. When 5 lines are drawn in a plane, what is the maximum number of intersections that can occur?
6. When 10 lines are drawn in a plane, what is the maximum number of intersections that can occur?




First Problem: How many ways can all six numbers in the set $\{4, 3, 2, 12, 1, 6\}$ be ordered so that a comes before b whenever a is a divisor of b ?

Second Problem: In some languages, every consonant must be followed by a vowel. How many seven-letter “words” can be made from the Hawaiian word MAKALA if each consonant must be followed by a vowel?

Third Problem: A circular pizza is cut 5 times with straight line cuts before being removed from the pan. What is the maximum number of pieces that can be made which contain none of the pizza’s outer crust, located around its circumference?

 Follow-up Problems

7. How many ways can all seven numbers in the set $\{4, 3, 2, 8, 12, 1, 6\}$ be ordered so that a comes before b whenever a is a divisor of b ?
8. Seven students sit in a row of 7 chairs. Ben insists on sitting next to Amy, and Carol insists on sitting next to Dave. In how many ways can the seven students be seated?
9. When a single circle is drawn in a plane, it divides the plane into two regions—inside the circle and outside the circle. What is the maximum number of regions into which we can divide a plane when we draw 5 circles in the plane?

 Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).