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10. A croissant shop has plain croissants, cherry croissants, chocolate croissants, almond croissants, apple croissants, and broccoli croissants. How many ways are there to choose:

   a) a dozen croissants?
   b) three dozen croissants?
   c) two dozen croissants with at least two of each kind?
   d) two dozen croissants with no more than two broccoli croissants?
   e) two dozen croissants with at least five chocolate croissants and at least three almond croissants?
   f) two dozen croissants with at least one plain croissant, at least two cherry croissants, at least three chocolate croissants, at least one almond croissant, at least two apple croissants, and no more than three broccoli croissants?

12. How many different combinations of pennies, nickels, dimes, quarters, and half dollars can a piggy bank contain if it has 20 coins in it?

14. How many solutions are there to the equation:
   \[ x_1 + x_2 + x_3 + x_4 = 17, \]
   where \( x_1, x_2, x_3, \) and \( x_4 \) are nonnegative integers?

18. How many strings of 20-decimal digits are there that contain two 0s, four 1s, three 2s, one 3, two 4s, three 5s, two 7s, and three 9s?

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10. There are 12 signs of the zodiac. How many people are needed to guarantee that at least six of these people have the same sign?

12. How many people are needed to guarantee that at least two were born on the same day of the week and in the same month (perhaps in different years)?

18. Show that if five points are picked in the interior of a square with a side length of 2, then at least two of these points are no farther than \( \sqrt{2} \) apart.

30. Show that \[ \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} 1 = \binom{n}{2} \] if \( n \) is an integer with \( n \geq 2 \).