

Evaluate the following and simplify. Assume that  $x$  is an integer greater than 2.

1)  ${}_5P_3$       A) 3      B) 5      C) 10      D) 15      E) None of these

2)  ${}_{12}C_4$       A) 4      B) 8      C) 48      D) 495      E) None of these

3) Johnny goes to the pet store. His parents tell him that he may choose 3 puppies to take home. The pet store has a total of 12 puppies. How many possible different groups of puppies can he take home?  
A) 1320      B) 660      C) 220      D) 36      E) None of these

4) Jimmy, Janie, and Joan walk into a pet store, each to select a puppy to take home. The pet store has a total of 12 puppies. In how many different ways can three puppies be paired with the new owners.  
A) 1320      B) 660      C) 220      D) 36      E) None of these

(For problems 5 through 7) From a group of 14 men and 11 women, a committee of four must be selected. Match the letter of the correct answer on the right with the question on the left.

5) How many ways can such a committee be selected?      A) 44      H) 350  
B) 56      K) 2310

6) How many ways can we select a committee with two men and two women?      C) 100      M) 2640  
D) 146      P) 5005  
E) 165      R) 12,650

7) How many ways can we select a committee with a majority of women?      F) 275      T) 63,313,250  
X) None of these

8) Penelope has 12 marbles, all of the same size and shape. 7 of them are blue, 3 are green, and two are red. If the order of the colors is all that matters, then how many different ways can she line the marbles up?  
A) 479001600      B) 42      C) 7920      D) 60480      E) None of these

9) In how many distinguishable ways can all 11 letters of the word MISSISSIPPI be arranged?  
A) 11      B) 32      C) 352      D) 34650      E) 39916800      F) None of these

10) Mya is on her way to order a new Ferrari Sportster. The Sportster is available in five different colors. She also has a choice of a convertible or hard top. After that, she will chose between three different color interiors. Once she picks the color of the interior, she must choose either leather or cloth. Then she'll choose between three different engines. Last, she'll choose either a manual transmission or an automatic. In how many different ways could she order her Sportster?      A) 6      B) 45      C) 270      D) 180      E) None of these

11) A lottery machine outputs six different numbers from a total of 41. The order of the numbers is irrelevant. How many different groups of six numbers are possible?  
A) 246      B) 4,496,388      C) 3,237,399,360      D) 4,750,104,241      E) None of these

(For problems 12 through 16) If we have 4 red, 4 blue, 4 green, 4 white, and 4 black marbles. For each color, we have a small, a medium, a large, and a jumbo marble. (For the following problems, assume that order is irrelevant.)

How many ways can we choose 3 marbles such that:

12) All three are one color?

13) Two are one color, one is another color?

14) We have one small, one medium, and one large?

15) All three are Jumbo?

16) They are all different colors?