

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

1) ${}_{13}P_5$ 2) ${}_{13}P_8$ 3) ${}_{15}C_4$ 4) ${}_{15}C_{11}$ 5) ${}_xP_{x-2}$ 6) ${}_xC_{x-3}$

7) In the National Football League, there are 16 teams in the NFC and 16 teams in the AFC. In the Superbowl, one team from the NFC plays one team from the AFC. How many different matchups are possible for the Superbowl?

8) In a pizza special, one must pick exactly three different toppings to put on a pizza. If there are a total of 20 toppings, how many different pizzas can be made?

9) By a court decision, three brothers must choose different states to live in. (no two can live in the same state) How many different ways can they choose which states to live in? (50 states)

10) A company is sending three employees to a conference in New York. If they have 30 employees, how many different groups can be chosen?

11) A company is sending three people to three different conferences. One in Montana, one in Tokyo, and one in Minsk. If they have 30 employees, how many ways can this be done?

12) From a group of 13 men and 16 women, a committee of five must be selected.

- How many different ways can such a committee be selected?
- How many different ways can we select a committee with two men and three women?
- How many different ways can we select a committee with a majority of men?

13) There are 12 chips that are identical except for color. 6 are black, 4 are green, and 2 are white. In how many distinguishable ways may the chips be stacked?

14) In how many different ways can all of the digits of the number 1,545,653,954 be rearranged?

15) If we have 5 red, 5 blue, 5 green, 5 brown, 5 white, and 5 black marbles. For each color, we have a tiny, 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 4 marbles such that:

- All four are one color?
- Three are one color, one is another color?
- Two are one color, the other two are another color?
- Exactly two are red, one is blue, and one is white?
- We have one small, two medium, and one large?
- All four are tiny?
- Two are one color, one is a second color, and one is a third color?
- They are all different colors?

Solutions to Practice 2 (revision 0)

- 1) 154,440 2) 51,891,840 3) 1365 4) 1365 5) $\frac{x!}{2}$ 6) $\frac{x(x-1)(x-2)}{6}$
- 7) 256 8) 1140 9) 117,600 10) 4060 11) 24,360 12a) 118,755 b) 43680 c) 47047
- 13) 13860 14) 75600 15a) 30 b) 1500 c) 1500 d) 250 e) 540
- f) 15 g) 15000 h) 9375