

10-8 Permutations and Combinations day 3

Nothing new to add to our table of contents or goals. You may continue taking notes on whatever page you were using yesterday.

**Objectives**  
 Solve problems involving the Fundamental Counting Principle.  
 Solve problems involving permutations and combinations.

Feb 7-12:03 PM

**Remember...**

You have 3 colors of wrapping paper and 4 kinds of ribbons. How many different ways are there to use one color of wrapping paper and one type of ribbon?

$$\frac{3}{\text{paper}} \cdot \frac{4}{\text{ribbons}} = 12$$

A new website requires a password consisting of 2 letters and 4 numbers. How many different passwords are possible if letters can't repeat, but numbers can repeat?

$$26 \cdot 25 \cdot 10 \cdot 10 \cdot 10 \cdot 10$$

A sandwich can be made with 3 different types of bread, 5 different meats, and 2 types of cheese. How many types of sandwiches can be made if each sandwich consists of one bread, one meat, and one cheese?

$$\frac{3 \cdot 5 \cdot 2}{15 \cdot 2} = 30$$

Jan 30-10:30 AM

How are the formulas for permutations and combinations similar? How are they different?

${}_n P_r = \frac{n!}{(n-r)!}$  Is this the formula for a permutation or a combination?

$${}_6 P_2 = \frac{6!}{(6-2)!} = \frac{6!}{4!} = \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!}} = 30$$

$${}_n C_r = \frac{n!}{r!(n-r)!}$$

$${}_7 C_3 = \frac{7!}{(7-3)! \cdot 3!} = \frac{7!}{4! \cdot 3!} = \frac{7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 3 \cdot 2 \cdot 1} = 35$$

Feb 7-12:28 PM

**Today you will need to decide if a problem involves a permutation or a combination.**

When the **order matters**, use the formula for **permutations**.

$${}_n P_r = \frac{n!}{(n-r)!}$$

When the **order does not matter**, use the formula for **combinations**.

$${}_n C_r = \frac{n!}{r!(n-r)!}$$

Jan 30-10:40 AM

**Tell whether each situation involves combinations or permutations. Then give the possible number of outcomes.**

1. In a talent show, the top 3 performers of 15 will advance to the next round. In how many ways can this be done?

$${}_{15} C_3$$

2. A family of 3 plans to sit in the same row at a movie theater. How many ways can the family be seated in 3 seats?

$${}_3 P_3$$

Jan 30-10:58 AM

**Tell whether each situation involves combinations or permutations. Then give the possible number of outcomes.**

3. A basketball team has 12 members who can play any position. How many different ways can the coach choose 5 starting players?

$${}_{12} C_5$$

4. When ordering a pizza, you can choose 2 toppings from the following: mushrooms, olives, pepperoni, pineapple, and sausage. How many different types of pizza can you order?

$${}_5 C_2$$

5. Three people in a writing contest are competing for first, second and third prize. How many ways can the 3 people be chosen?

$${}_3 P_3$$

Jan 30-10:59 AM

Assignment:

10-8 day 3 worksheet

Feb 7-3:02 PM