

13.3 Find Probabilities Using Combinations

TEKS 8.11.B



- Before**
- Now**
- Why?**

You used permutations to count possibilities.
 You will use combinations to count possibilities.
 So you can find the probability of an event, as in Example 3.

Key Vocabulary

- combination

A **combination** is a selection of objects in which order is *not* important. For instance, in a drawing for 3 identical prizes, you would use combinations, because the order of the winners would not matter. If the prizes were different, you would use permutations, because the order would matter.

EXAMPLE 1 Count combinations

Count the combinations of two letters from the list A, B, C, D.

Solution

List all of the permutations of two letters in the list A, B, C, D. Because order is not important in a combination, cross out any duplicate pairs.

AB	AC	AD	BA	BC	BD	← BD and DB are the same pair.
CA	CB	CD	DA	DB	DC	

► There are 6 possible combinations of 2 letters from the list A, B, C, D.

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GUIDED PRACTICE for Example 1

1. Count the combinations of 3 letters from the list A, B, C, D, E.

COMBINATIONS In Example 1, you found the number of combinations of objects by making an organized list. You can also find the number of combinations using the following formula.

KEY CONCEPT	<i>For Your Notebook</i>
<p>Combinations</p> <p>Formula</p> <p>The number of combinations of n objects taken r at a time, where $r \leq n$, is given by:</p> ${}_n C_r = \frac{n!}{(n-r)! \cdot r!}$	<p>Example</p> <p>The number of combinations of 4 objects taken 2 at a time is:</p> ${}_4 C_2 = \frac{4!}{(4-2)! \cdot 2!} = \frac{4 \cdot 3 \cdot \cancel{2!}}{\cancel{2!} \cdot (2 \cdot 1)} = 6$