

Fundamental Counting Principle:

Opening Question:

If you have 3 shirts (red, yellow, and green) and 2 pairs of pants (khaki and denim), how many outfits could you put together?

* Assuming an outfit is 1 pair of pants and 1 shirt

Fundamental Counting Principle:

If one event can occur in "m" ways and another event can occur in "n" ways, then the number of ways that both events can occur is $m \cdot n$. This principle can be extended to two or more events.

Using the Fundamental Counting Principle:

1. Radio station call letters consist of four letters beginning with either a K or a W.

How many different radio station call letters are possible if...

A. letters can be repeated? $2 \cdot 26 \cdot 26 \cdot 26 = 35,152$

B. letters cannot be repeated? $2 \cdot 25 \cdot 24 \cdot 23 = 27,600$

Using the Fundamental Counting Principle:

2. A baseball coach is determining the batting order for the team. The team has 9 players, but the coach does not want the pitcher to be one of the first four to bat. How many batting orders are possible?

$$\frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{\times \times \times \times} = 201,600$$

Using the Fundamental Counting Principle:

3. How many different 4-digit numbers can be formed from the digits 1, 2, 3, and 4 if...

A. digits can be repeated? $\underline{4} \cdot \underline{4} \cdot \underline{4} \cdot \underline{4} = 256$

B. digits cannot be repeated? $\underline{4} \cdot \underline{3} \cdot \underline{2} \cdot \underline{1} = 24$

Using the Fundamental Counting Principle:

4. How many different 5-digit zip codes can be formed if...

A. digits can be repeated? $\underline{10} \cdot \underline{10} \cdot \underline{10} \cdot \underline{10} \cdot \underline{10}$

B. digits cannot be repeated?

$$\underline{10} \cdot \underline{9} \cdot \underline{8} \cdot \underline{7} \cdot \underline{6}$$

$$100,000$$
$$30,240$$