

Counting Principle

Sometimes we need to find out how many outcomes there are in a situation without needing a list of the items.

For example, how many different sandwiches can be made with 2 bread choices, 3 meat choices and 3 cheese choices?

By making a tree diagram, how can we find out how many sandwiches can be made?

counting principle - the multiplication process used to find the number of outcomes possible in a situation.

A coin is tossed five times. How many arrangements of heads and tails are possible?

By using the Counting Principle, the sample space (all possible arrangements) will be $2 \times 2 \times 2 \times 2 \times 2 = 32$ arrangements of heads and tails.

1.



A movie theater sells 3 sizes of popcorn (small, medium, and large) with 3 choices of toppings (no butter, butter, extra butter). How many possible ways can a bag of popcorn be purchased?

Choose one:

3

9

27

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Ice cream sundaes come in vanilla, chocolate, strawberry, mint, and coffee. Possible toppings are sprinkles, Oreo crumbles, syrup, and nuts.

How many different sundaes can be made with one flavor of ice cream and one topping?

$$5 \times 4 = 20$$

License plates in a certain state contain 3 digits (0 - 9) followed by 3 letters.

Assume that all combinations are equally likely.

Show how you would calculate the number of possible license plates.

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

17,576,000 Digits=10
Letters=26



Heather has finally narrowed her clothing choices for the big party down to 3 skirts, 2 tops and 4 pair of shoes. How many different outfits could she form from these choices?

$$3 \times 2 \times 4 = 24$$