

Sample Space = the list of all possible outcomes.

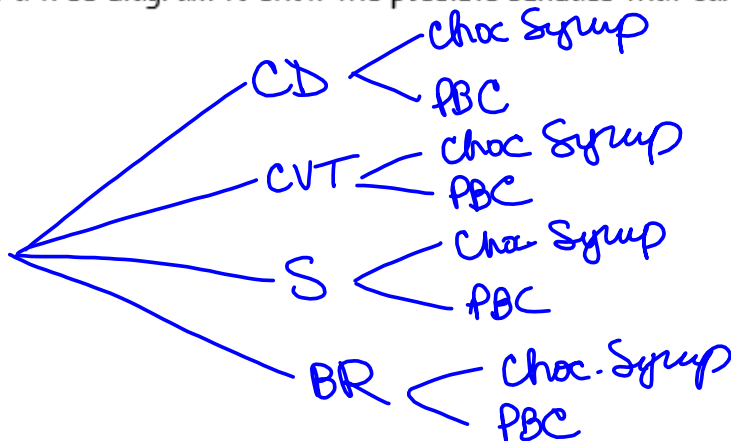
Sample space can be represented many ways, but the most common are a tree diagram or a set of ordered pairs/triples/etc.

. At the Banana Boat ice-cream store, there are four possible flavors of ice-cream:

Cookie Dough, Choc/Van Twist, Strawberry, Black Raspberry.

There are two possible toppings: Choc. Syrup or PB cups.

a. Draw a tree diagram to show the possible sundaes that can be made.



List the sample space for the possible sundaes.

$\{(CD, CS), (CD, PBC), (CVT, CS), (CVT, PBC),$
 $(S, CS), (S, PBC), (BR, CS), (BR, PBC)\}$

How many sundaes were possible? (1 ice cream and 1 topping)

8

Are the outcomes in the sample space equally likely? Explain your answer.

No - depends on personal preference

Counting Principle

Counting Principle → If one choice can occur in any of m ways and a second choice can occur in any of n ways, then the total number of ways both can occur is $m \cdot n$.

4 ice creams X 2 toppings

1. Nicole purchased 3 blouses, 3 jackets, and 2 skirts. How many different outfits using a blouse, a jacket, and a skirt are possible?

$$3 \text{ shirts} \times 3 \text{ jackets} \times 2 \text{ skirts} = 18$$

2. An Internet code consists of one ⁰⁻⁹digit followed by one ^{A-Z}letter. The number zero and the letter O are excluded. How many codes are possible?

$$\frac{9}{1-9} \times \frac{25}{\text{letter No O}} = 225$$

3. A hiker can take 4 trails to the lake and then 3 trails from the lake to the cabins. How many routes are there to get to the lake and then to the cabins?

$$4 \times 3 = 12$$

4. The cheerleading squad is making posters. They have 4 different colors of poster board and 5 different colors of markers. How many different posters can be made by using one poster board and one marker?

$$4 \times 5 = 20$$

5. How many identification codes are possible by using 3 letters if no letter may be repeated?

$$\underline{26} \times \underline{25} \times \underline{24} = 15,600$$

6. A six-sided die and a fair coin are tossed together. How many outcomes are in the sample space?

$$\frac{6}{\text{die}} \times \frac{2}{\text{H,T}} = 12$$

7. How many 7-digit telephone numbers can be created if the first digit cannot be 0?

$$\frac{9}{1-9} \times \frac{10}{0-9} \times \frac{10}{0-9} \times \frac{10}{0-9} \times \frac{10}{0-9} \times \frac{10}{0-9} \times \frac{10}{0-9}$$

9,000,000

Find the number of possible outcomes in the sample space.

- 7) A jewelry store sells gold and platinum rings. Each ring is fitted with a ruby, sapphire, emerald, or diamond gemstone.

$$2 \times 4 = 8$$

- 8) A spinner can land on either red, blue, or green. You spin twice.

$$3 \times 3 = 9$$

- 9) Eight rooms in a house need to be painted. Each room can be painted white or yellow.

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$2^8 = 256$

- 10) Six books need to be placed on a shelf. You randomly arrange the books on the shelf from left to right.

$$6 \times 5 \times 4 \times 3 \times 2 \times 1$$

720

6!

Homework:

Fundamental Counting Principle Worksheet