Unit 11 Day 1 Notes Fundamental Counting Principle



Example 1

You go to your favorite ice cream shop and want to order an ice cream cone. There are 5 different kinds of ice cream to choose from (chocolate, vanilla, cookies and cream, rocky road, and mint chocolate chip) and 2 different kinds of cones (waffle and sugar). How many kinds of single scoop ice cream cones could you order?

ice cone 10 combinations

Number of cones:

Number of outfits: <u>12</u>

Example 2

a) Maya is choosing her outfit for school. She hasn't done her laundry in a while, so she only has 3 pairs of pants (black, grey, and white) and 4 different colored shirts (purple, red, green, and pink) to choose from. How many possible outfits can she make?

3	4	=	12 outfits
pants	shirts		

 Fundamental Counting Principle

 If:

 Event A can happen a ways

 Event B can happen b ways

 Event B can happen b ways

 Then:

 The number of ways to do Event A and Event B is

b) Now Maya is trying to decide which shoes to wear and she is choosing from her flip flops or her pair of converse shoes. How many possible outfits could she pick from her 3 pairs of pants, 4 shirts, and 2 pairs of shoes?

3.4.2 = 24

Number of outfits: _____

VOCABULARY

Random Experiment: the outcome cannot be predicted with certainty Outcome: a possible result of an experiment Event: a set of onthomes to which a probability is assigned Sample Space: the set of all possible outcomes Independent Events: "A" occurring does not affect the probability of "B" Dependent Events: The outcome of "A" affects the outcome of "B"

Example 3

If Ellie has 3 skirts and 8 pants, how many ways can she pick a skirt **or** pants? (Notice this time I am asking one **or** the other.)

 3+8
 Number of outfits:

 If:

 Event A can happen a ways

 Event A can happen a ways

 Event B can happen b ways

 Then:

 Then:

 The number of ways to do A or

 B is ______

 Vour Turp

Your Turn...

A restaurant has 8 different types of salads and 9 different types of pastas.

 a) In how many ways can you order a salad and a dish of pasta?
 b) In how many ways can you order a salad or a dish of pasta?
 b) In how many ways can you order a salad or a dish of pasta?
 c) A co-ed ultimate Frisbee team has 7 girls and 8 boys.
 a) In how many ways can the coach pick a girl and a boy captain?
 c) R = 56
 b) In how many ways can the coach pick a girl or a boy captain?
 c) R = 15

 If you have two dice, how many possible outcomes are there?

Example 4

You are out to buy a sweet new ride. You can get a sedan or hatchback, each could be black, blue, red, white, or silver and each could have one of three trim levels (S:super, SD:super deluxe, SDD:super-duper deluxe).

- a) How many different cars could you have? $2 \cdot 5 \cdot 3 = 30$
 - b) What if the manufacturer didn't allow black sedans?

Black sedan s Black sedan SD Black sedan SDD

30-3 =

Example 5

You have 6 choices of ice cream and 3 cones. How many ice cream cones can you make if you have 1 scoop and 1 cone? What about if you have 2 scoops and a cone? What if you have 2 scoops and a cone, but the scoops must be different flavors? $6 \cdot 6 \cdot 3 = 108$

$$6.3 = 18$$

Example 6

a) How many license plates are there that must have a letter followed by 6 digits?

$$\frac{26 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10}{4 + 4 + 4} = 26,000,000$$

b) How many license plates are there that must have a letter followed by 6 different digits?

$$\frac{26}{444} \cdot \frac{10}{4} \cdot \frac{9}{44} \cdot \frac{8}{44} \cdot \frac{7}{6} \cdot \frac{6}{5} = 3,931,200$$

c) How many license plates are there that must have a letter followed by 6 different digits and may not start with the letters B or M?

$$\frac{24}{80} + \frac{10}{47} + \frac{9}{47} + \frac{8}{47} + \frac{7}{47} + \frac{6}{5} = 3,628,800$$

Practice:

1) How many 3 letter "words" are possible? A "word" is any arrangement of letters?

$$\frac{26}{26} \cdot \frac{26}{26} \cdot \frac{26}{26} = 17,576$$

2) How many 3 letter "words" are possible if no repeating of letters is allowed?

$$\frac{26 \cdot 25 \cdot 24}{15,600} = 15,600$$

Challenge:

How many 5 letter words can you form by arranging the letters in HINSDALE (no repeating)?

 $\frac{8}{7} \cdot \frac{7}{6} \cdot \frac{5}{5} \cdot \frac{4}{4} = 6,720$