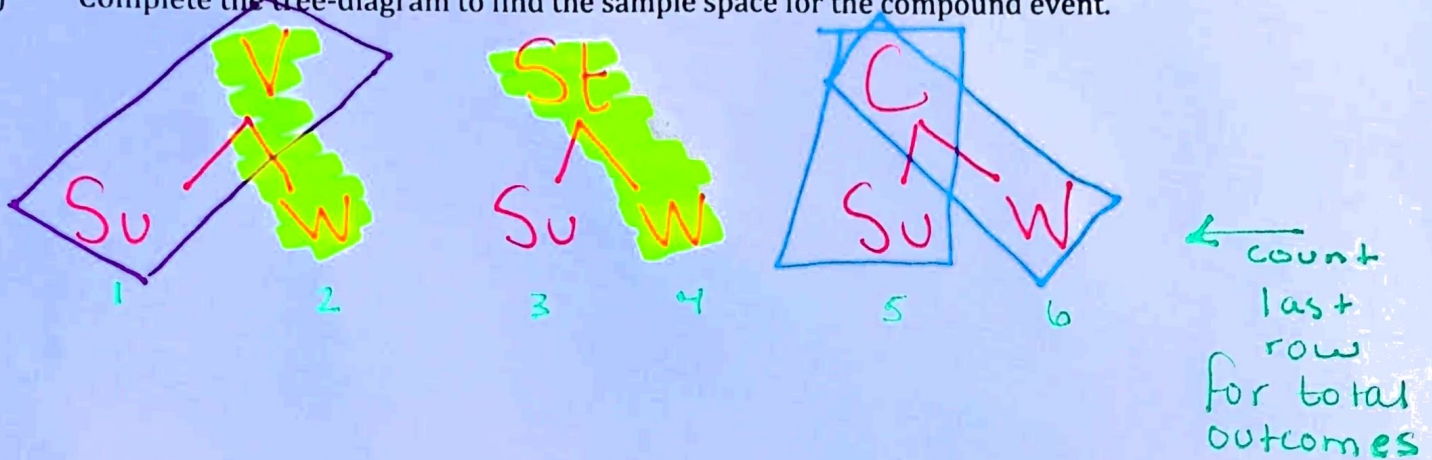


Compound Events (Tree Diagrams)

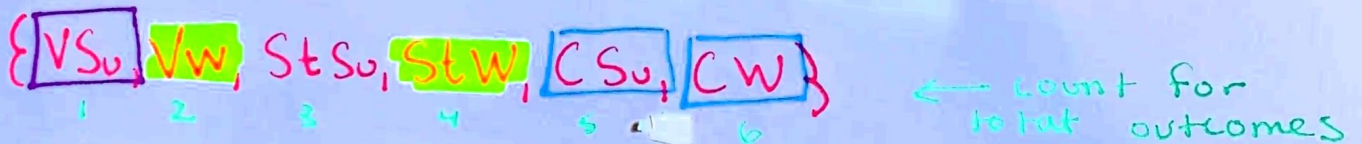
Aim: How do you find the probability of a compound event using a tree diagram and the FCP?

Example 1: An ice-cream shop has the choice of 3 flavors of ice-cream (vanilla, strawberry or chocolate). Customers also have a choice of 2 types of cones (sugar or waffle). Each combination is equally likely. Find the probability of choosing an ice-cream cone at random and getting a sugar cone with vanilla ice-cream.

a) Complete the tree-diagram to find the sample space for the compound event.



b) List the sample space. [Trace each branch; this is one possible outcome.]



c) How many outcomes are in the sample space?

6

d) What is the probability of choosing a sugar cone with vanilla ice-cream?

1/6

e) P(choosing a chocolate ice-cream cone) = 2/6

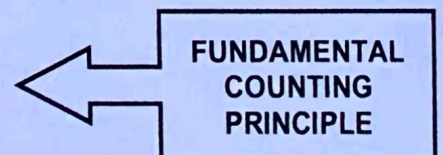
f) P(choosing a waffle cone with strawberry or vanilla ice-cream) = 2/6

Check It!

How can you find the number of possible outcomes without making a tree-diagram or table?

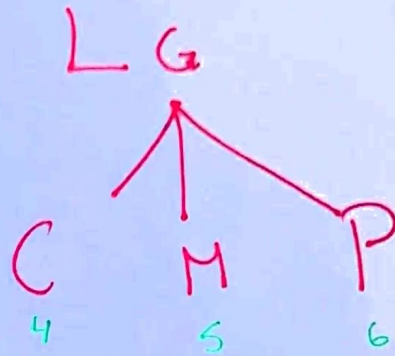
Multiply # in each category:
Flavor x Cones

$$3 \times 2 = 6$$



Example 2: Tommy's Pizza offers two different size pizzas; small and large. Customers also have a choice of toppings: cheese, mushroom and pepperoni. Each combination is equally likely.

- 1) Make a tree diagram.



6 total outcomes

- 2) List the sample space.

$\{\underline{S_m C}, \underline{S_m M}, \underline{S_m P}, \underline{L_g C}, \underline{L_g M}, \underline{L_g P}\}$

- 3) Find the probability of the following.

a) $P(\text{small}) = \frac{3}{6}$

b) $P(\text{pepperoni}) = \frac{2}{6}$

c) $P(\text{large, mushroom}) = \frac{1}{6}$

d) $P(\text{cheese or mushroom}) = \frac{4}{6}$

- 4) If Tommy's pizza starts to offer 3 different sizes and 5 toppings, how many combinations of one size and one topping pizzas are possible? [Hint: Do not make a tree diagram.]

FCP

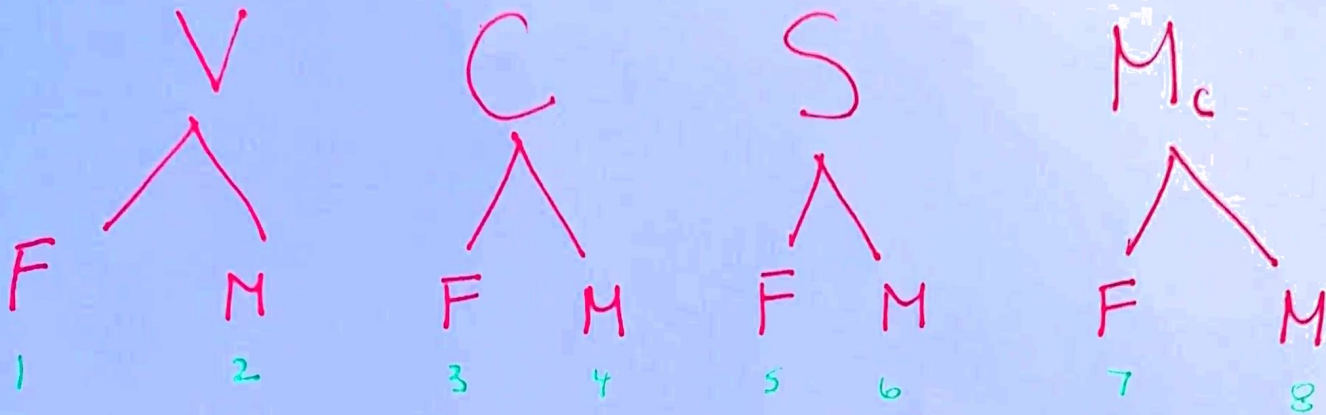
Size \times Toppings

$3 \times 5 = 15$

Try it!

Ice cream sundaes come in 4 flavors, vanilla, chocolate, strawberry and mint chip with 2 possible toppings, fudge or marshmallow.

a) Create a tree diagram.



8 total outcomes

b) List the sample space.

{VF, VM, CF, CM, SF, SM, McF, McM}

c) Find the probability of having an ice cream sundae with strawberry ice cream and marshmallow.

$$\frac{1}{8}$$

d) Find the probability of having an ice cream sundae with fudge.

$$\frac{4}{8}$$

2) If a deli offers three breads, 6 meats and 4 toppings, how many outcomes are possible?

FCP

$$\text{Bread} \times \text{Meat} \times \text{Toppings} \\ 3 \times 6 \times 4 = 72$$

Challenge: If a coin is flipped three times, how many outcomes are possible?

$$\frac{2}{1\text{st}} \times \frac{2}{2\text{nd}} \times \frac{2}{3\text{rd}} = 8$$