

Warm Up

1) Write the sample space (universal set) for the following experiment:

- Randomly picking a one month of the year

$$\Omega = \{\text{Jan, Feb, Mar, April, May, June, July, Aug, Sept, Oct, Nov, Dec}\}$$

2) You flip a coin three times in a row.

a) Write the sample space.

$$\Omega = \{(H,H,H), (H,H,T), (H,T,H), (H,T,T), (T,H,H), (T,T,H), (T,H,T), (T,T,T)\}$$

b) What is the probability of landing on Tails all three times?

$$P(T, T, T) = 1/8$$

c) What is the probability of landing on Tails at least twice?

$$P = 1/2$$

3) If Subway has 8 vegetable toppings, how many different ways can you pick 4 toppings? $8 \times 7 \times 6 \times 5 / 4! = 70$

Situational Problem Reminder

02 Group – Tuesday, April 12th

04 Group – Thursday, April 14th

Topics include

- Algebra and Equations
- Linear Relations ($y = ax + b$)
- Missing Measures and Similar Solids

Only one 2-sided memory aid will be permitted

Today we will draw and use probability trees to calculate the probability of compound events.

So that we can better visualize all the possible outcomes in a situation.



Keys to Success:

- I can draw the tree and indicate probabilities on each branch
- I understand the difference between “With” and “Without” replacement
- I list all outcomes
- I multiply along the branches (“AND”)
- I can calculate the probability of (“OR”) questions by adding

“OR”

You draw 1 card out of a 52-card deck.

a) What is the probability of it being a king?

prob = what you want / total # of possibilities

$$P(K) = 4 / 52 \text{ or } 1 / 13$$

b) What is the probability of it being the king of spades OR the ace of spades?

$$P(\text{ace of spades}) = 1/52$$

$$P(\text{king of spades}) = 1/52$$

$$P(\text{king of spades OR ace of spades}) = 2 / 52, \text{ or } 1 / 26$$

When you see **OR** in a question, think (+ ADDITION)

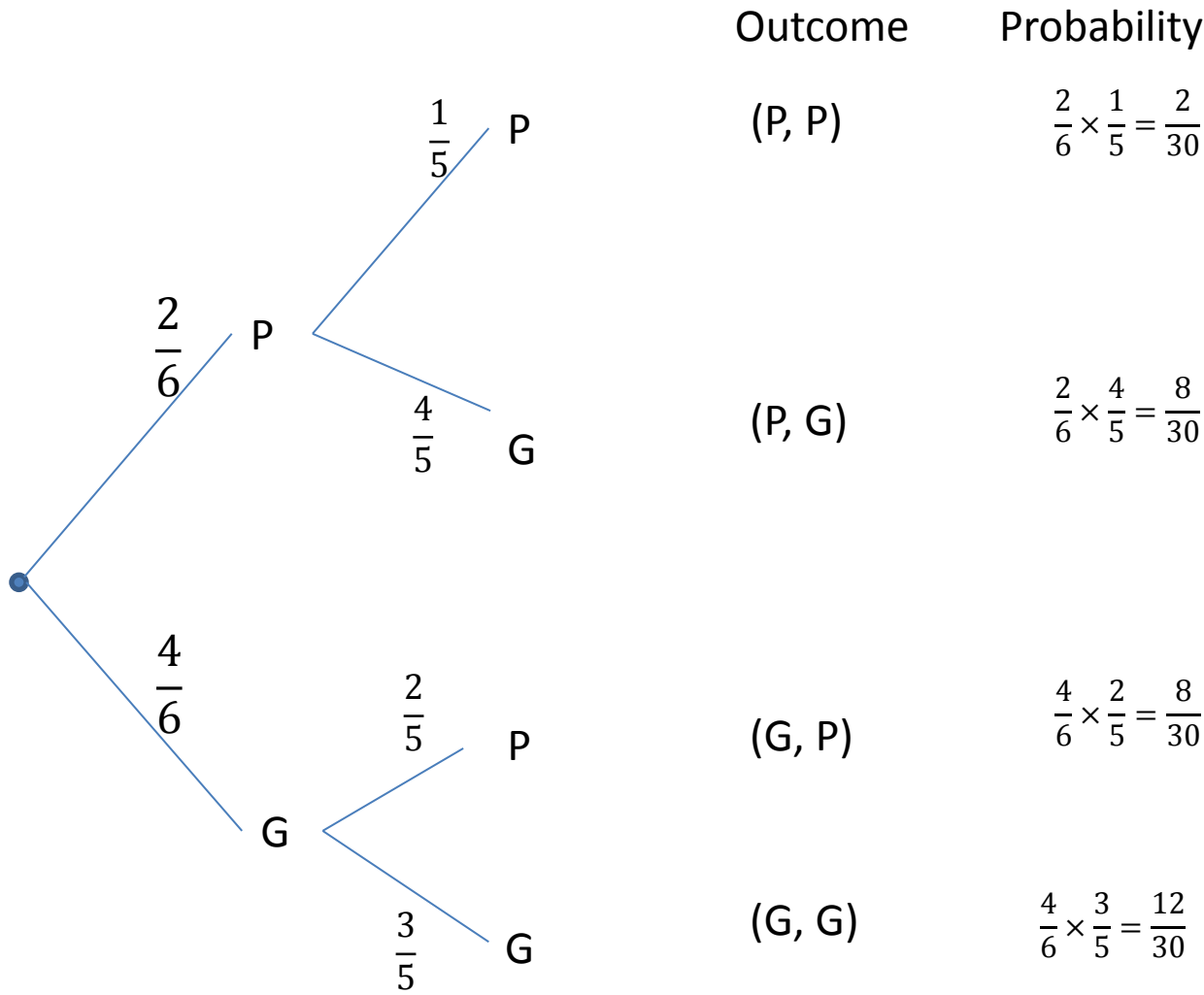
Just add the probabilities of each outcome!

AND....

If you see “**AND**”, or “**AND THEN**” in a probability question, it means you’re going to have to multiply your events together!

Ex: (Probability: no replacement)

- You have bag of Skittles that is almost empty. It has 2 purple, and 4 green. You randomly choose 1 Skittle, eat it, **AND** then choose a second. **Draw the probability tree, and determine the probability of each outcome**



Follow-Up questions

- 1) What is the probability of getting two purple skittles? $2/30$
- 2) What is the probability of getting *at least* one purple skittle? $2/30 + 8/30 + 8/30 = 18 / 30$, or $3 / 5$
- 3) What is the probability of getting NO purple skittles? $1 - 18/30 = 12/30$

Takeaways...

AND = multiply

OR = add

TREES = your friends 😊

- They *visually* help you figure out the number of possible outcomes
- They *visually* help you figure out the probability of very specific events
- They will help you figure out more difficult probability questions

Practice!

Workbook, page 138, 140 and 141

Remember your AND/OR rules!



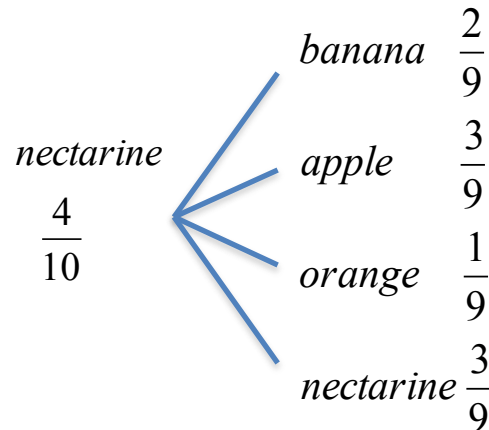
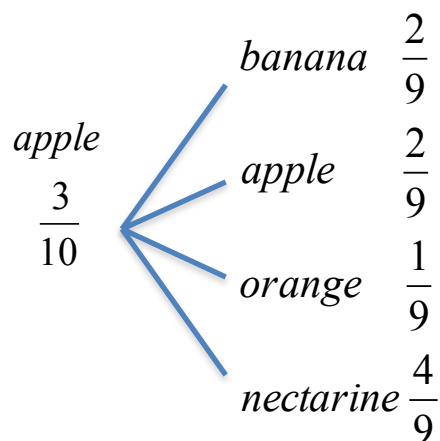
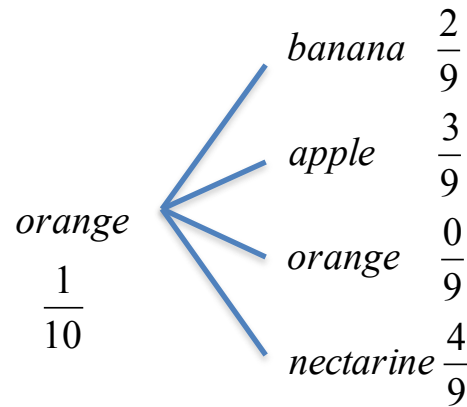
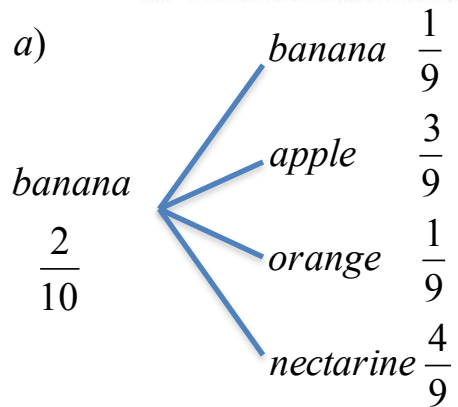
6

A fruit basket has 2 bananas, 3 apples, 1 orange and 4 nectarines. You randomly choose a fruit, and then eat it. You randomly choose another and eat it as well.

a) Construct the probability tree representing this situation.

b) What is the probability of eating:

- 1) an apple followed by a banana?
- 2) an orange and an apple?
- 3) at least one fruit whose name includes the letter "n"?
- 4) two nectarines?



b)

$$1) P(\text{apple, banana}) = \left(\frac{3}{10}\right)\left(\frac{2}{9}\right) = \frac{6}{90} = \frac{1}{15}$$

$$2) P(\text{orange, apple}) = \left(\frac{1}{10}\right)\left(\frac{3}{9}\right) = \frac{3}{90} = \frac{1}{30}$$

$$3) P(\text{one fruit with 'n'}) = \left(\frac{3}{10}\right)\left(\frac{2}{9}\right) = \frac{6}{90} = \frac{1}{15}$$

$$4) P(\text{nectarine, nectarine}) = \left(\frac{4}{10}\right)\left(\frac{3}{9}\right) = \frac{12}{90} = \frac{2}{15}$$

7

From a deck of 52 cards, what is the probability of randomly drawing:

- a heart?
- the king of clubs or the 7 of hearts?
- the 3 of spades and then, without replacing it in the deck, the 5 of hearts?
- the four aces one after the other?

$$a) P(\text{heart}) = \frac{13}{52}$$

$$b) P(\text{king of clubs, or 7 of hearts}) = \frac{1}{52} + \frac{1}{52} = \frac{2}{52} = \frac{1}{26}$$

$$c) P(3 \text{ of spades, 5 of hearts}) = \left(\frac{1}{52}\right)\left(\frac{1}{51}\right) = \frac{1}{2652}$$

$$d) P(\text{ace, ace, ace, ace}) = \left(\frac{4}{52}\right)\left(\frac{3}{51}\right)\left(\frac{2}{50}\right)\left(\frac{1}{49}\right) = \frac{1}{270725}$$