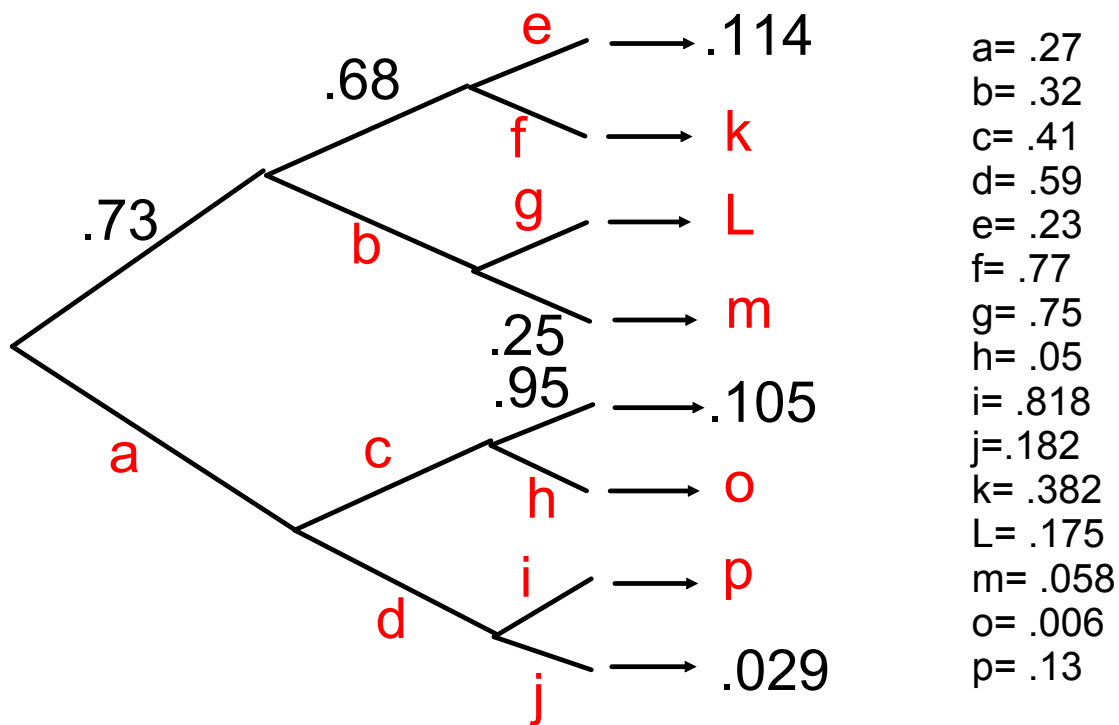


Fill in the tree diagram.

Stick Quiz



Box 1 contains **3 red marbles**, **2 black marbles** and **6 green marbles**. A second box contains **1 red**, and **4 green marbles**. A ball is chosen from box 1 and then box two. Make a tree diagram and answer the following:

1. What is the probability of picking green and then red?

$P(G \text{ and } R) =$ 6/55

2. What is the probability of picking black and then green

$P(B \text{ and } G) =$ 8/55

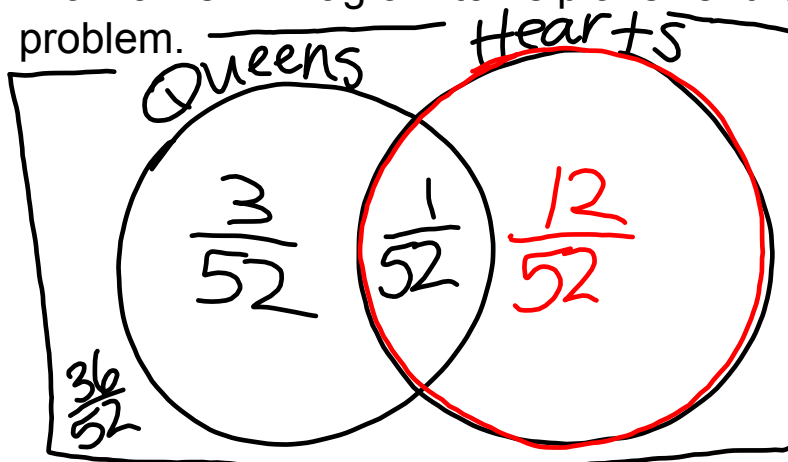
? ? ? ? ?
? Questions ?
? ? ? ? ?
? On ?
? ? ? ? ?
? Homework ?
? ? ? ? ?

Venn Diagrams

I can... use Tree and Venn diagrams to find probabilities.

Fix the VENN WORKSHEET - cross out the sentence that says "Everyone answered that they liked at least one"

A card is drawn from a well-shuffled deck of 52 playing cards. What is the probability that it is a queen or a heart. Draw a Venn Diagram to help answer the problem.



$$= \frac{16}{52} = \frac{4}{13}$$

Use the following information to make a Venn Diagram.

100 People were asked if they like Football, Baseball and Soccer.

42 liked Football

32 liked Baseball

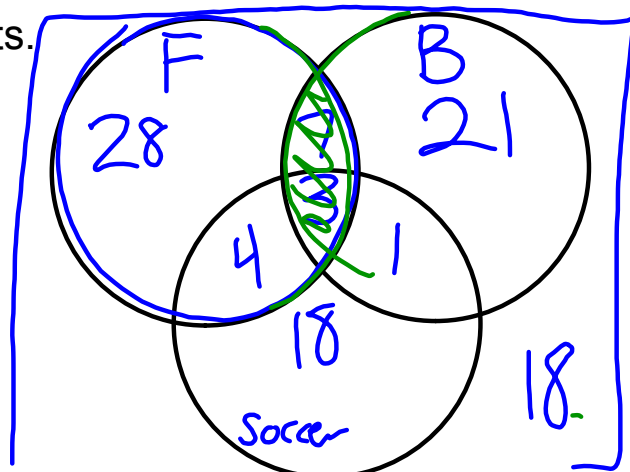
26 liked Soccer

3 people liked all three sports.

4 liked Baseball and Soccer $4-3=1$

7 liked Soccer and Football $7-3=4$

10 liked Football and Baseball



$$P(\text{F and B}) = \frac{10}{100}$$

$$P(\text{F or B}) = \frac{64}{100}$$

$$P(\text{Not B or S or F}) = \frac{18}{100}$$

You Try!! Use the following information to make a Venn Diagram.
 100 People were asked if they would like to be involved with theater, Art or FFA.

27 said Theater
 38 said Art
 51 said FFA

12 said FFA and Theater
 9 said Theater and Art
 17 said Art and FFA

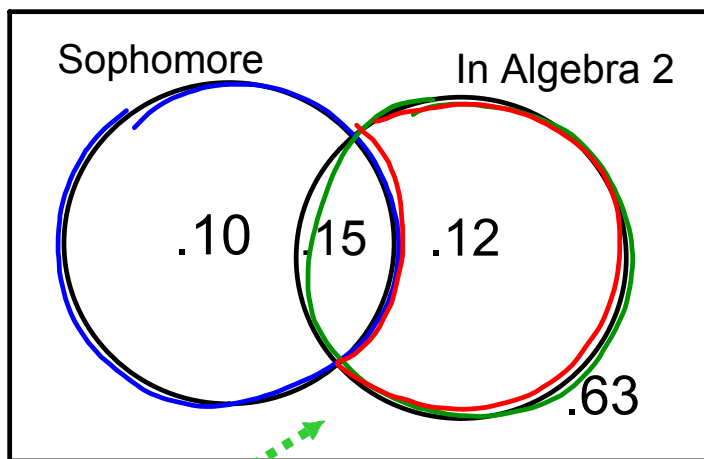
2 said All

$P(\text{F and T and A}) = \frac{2}{100}$

$P(\text{A or T}) = \frac{56}{100}$

$P(\text{A or F}) = \frac{72}{100}$

$P(\text{A and T}) = \frac{9}{100}$



Tap to reveal answer!

Find the probability of:

1) $P(S) = .25$

2) $P(\text{A and not S}) = .12$

3) $P(S|A) = \frac{.15}{.27} = .56$

4) $P(S \text{ or } A) = .37$

5) $P(\text{not } A) = .73$

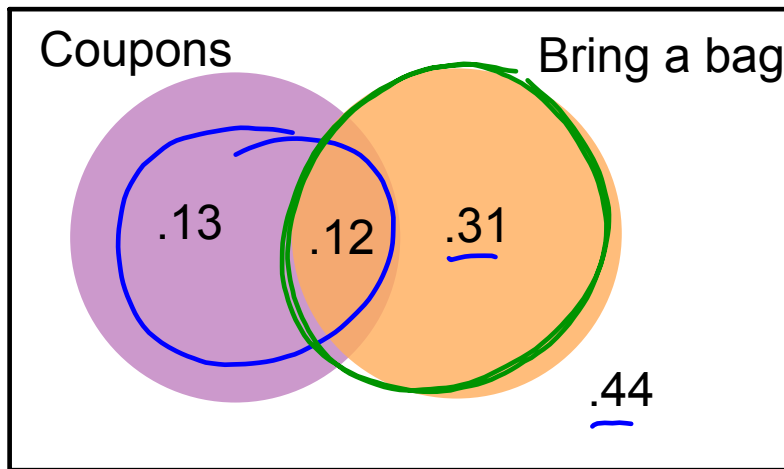
Already gives you the probabilities!!

← Given that

Note: $P(S|A)$ = Probability of a sophomore given that the student is in Algebra 2

You Try!!

At a grocery store customers were surveyed to see who used coupons and who brought their own bag from home.



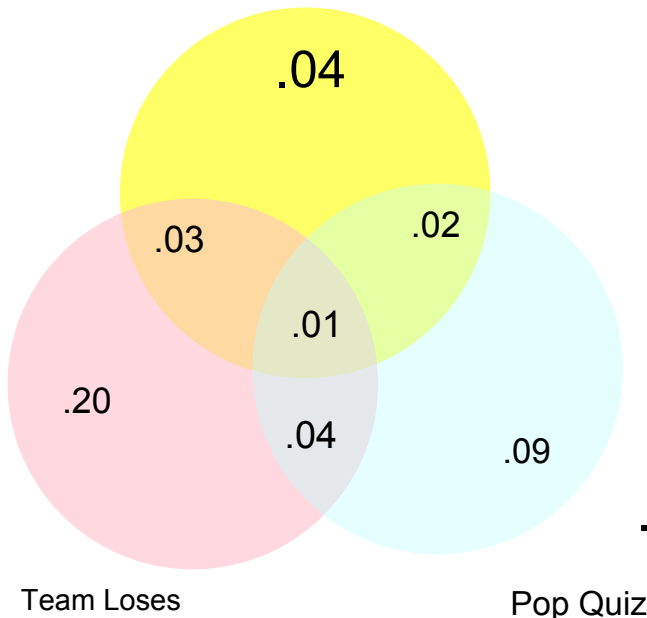
$$P(C \text{ and } B) = .12$$

$$P(\text{Not } C) = 1 - .25 = .75$$

$$P(C \text{ or } B) = .56$$

$$P(C|B) = \frac{.12}{.43} = .28$$

String Breaks



$$P(\text{Team Loses and Pop Quiz}) =$$

$$P(\text{String Breaks or Pop Quiz}) =$$

$$P(\text{Team Loses or Pop Quiz}) =$$

$$P(\text{pop quiz})$$

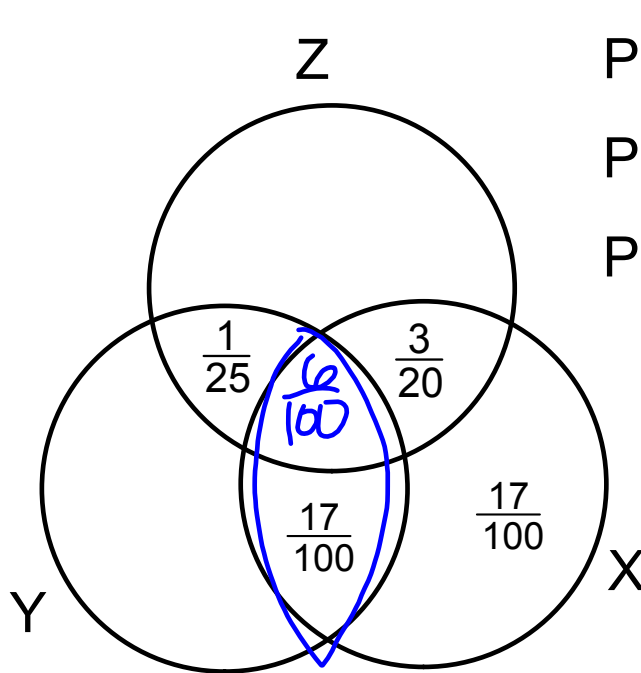
$$P(\text{good day})$$

$$P(\text{none happen})$$

$$P(\text{really bad day})$$

$$.57$$

Work with the people next to you! Try to finish the Venn Diagram given the following information.



$$P(Z \text{ and not } Y) = \frac{31}{100}$$

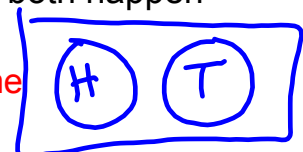
$$P(Y \text{ and } X) = \frac{23}{100}$$

$$P(Y) = \frac{39}{100}$$

Mutually Exclusive

mutually exclusive two outcomes or events that cannot both happen

example: flipping heads and tails at the same time



complement: two events that are (mutually exclusive) and make up all possible outcomes

Example: $P(3 \text{ or a } 6 \text{ on the first roll})$
 $P(\underline{\text{Not a } 3 \text{ and Not a } 6 \text{ on the first roll}})$

This covers all the options that can happen!

Mutually Exclusive Rule:

If events are mutually exclusive, the probability that any of them happen is the sum of their individual probabilities

$$\text{example: } P(\text{rolling } 2, 3, \text{ or } 5) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$

↑

$$= \frac{3}{6}$$

independent events: the occurrence of one has no influence on the occurrence of the other

Examples: P(6 on first roll) and P(6 on second roll)

P(H on first toss) and P(T on second toss)

In other words, if two events are independent, then:

$$P(A \text{ and } B) = P(A) \cdot P(B)$$



Just like the tree diagram....

General Addition Rule: (OR) One OR the Other -- not both

If A and B represent 2 events, the probability of at least one occurring is:

$$\begin{array}{l} \text{---} \\ \text{---} \end{array} \rightarrow P(A) \cdot P(B)$$

$$P(A \text{ OR } B) = P(A) + P(B) - P(A \text{ and } B)$$

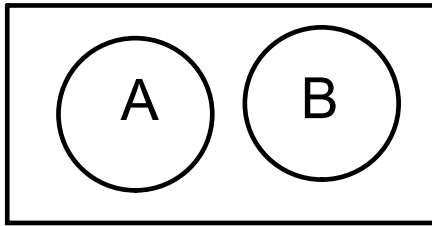
$$P(Q \text{ or } H) = \frac{4}{52} + \frac{13}{52} - \frac{4 \cdot 13}{52 \cdot 52}$$

$$\frac{17}{52} - \frac{52}{2704} = \frac{4}{13}$$

Independent versus Mutually Exclusive:

DON'T affect the probabilities of each other

AFFECT each other dramatically: if one occurs, the probability of the other occurring is 0



If $P(A) \neq 0$ and $P(B) \neq 0$,
Are A and B mutually exclusive or independent?

Mutually exclusive: Yes! They do not overlap! Tap!

Independent: No! $P(A \text{ and } B) \neq 0$. $P(A) \cdot P(B)$ would have to = 0

Homework
Venn Diagram
Worksheet