Name: _____ Hour: _____ Date: _____

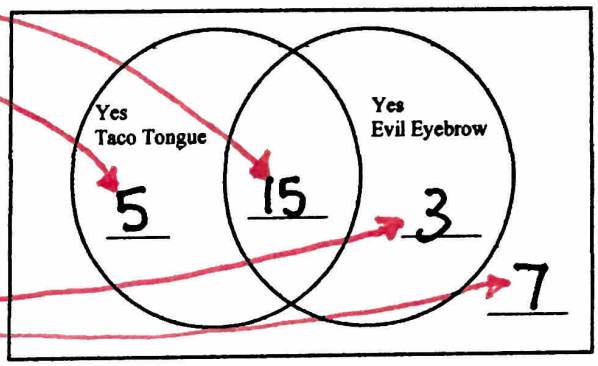
Can You Taco Tongue and Evil Eyebrow? Day 1

Some people believe that the ability to taco tongue and evil eyebrow is something that you are born with. Is this true? Are the two abilities somehow related?

1. Collect class data to fill in the following two-way table and Venn Diagram.

Class results vary

	Yes Evil Eyebrow	No Evil Eyebrow	Total
Yes Taco Tongue	15	5	20
No Taco Tongue	3	7	10
Total	18	12	30



2. Suppose that we randomly choose a student from class. Find the following probabilities.

P(Yes Taco Tongue) = 20/30

P(No Taco Tongue) = 10/30

P(Yes Taco Tongue AND Yes Evil Eyebrow) = 15/30

P(Yes Taco Tongue AND No Evil Eyebrow) = 5/30

P(Yes Evil Eyebrow) = 18/30

P(No Evil Eyebrow) = 12/30

P(Yes Evil Eyebrow AND No Taco Tongue) = 3/30

P(No Taco Tongue AND No Evil Eyebrow) = 7/30

3. Suppose that we randomly choose a student from class. Find the following probabilities.

Mutually Exclusive events

P(Yes Evil Eyebrow) = 18/30

P(No Evil Eyebrow) = 12/30

P(Yes Evil Eyebrow OR No Evil Eyebrow) = 30/30 = 18/30 + 12/30

P(A OR B) = P(A) + P(B)

4. Suppose that we randomly choose a student from class. Find the following probabilities.

NOT Mutually Exclusive events

P(Yes Taco Tongue) = 20/30

P(Yes Evil Eyebrow) = 18/30

P(Yes Taco Tongue OR Yes Evil Eyebrow) = 23/30 = 20/30 + 18/30 - 15/30

P(A OR B) = P(A) + P(B) - P(A and B)

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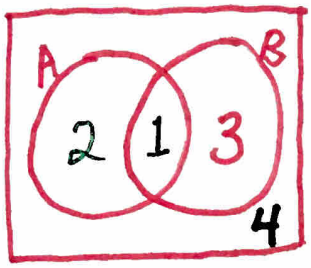
Venn Diagrams and the General Addition Rule

Important Ideas:

LT#1: Two-way tables & Venn Diagrams

	B	B^c
A	1	2
A^c	3	4



LT#2 General Addition Rule

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

If A and B are mutually exclusive $P(A \text{ and } B) = 0$ since they cannot occur together, so $P(A \text{ or } B) = P(A) + P(B)$

Check Your Understanding:

What is the relationship between educational achievement and home ownership? A random sample of 500 U.S. adults was selected. Each member of the sample was identified as a high school graduate (or not) and as a homeowner (or not). The two-way table displays the data. Suppose we choose a member of the sample at random. Define events

G: person is a high school graduate H: person is a homeowner.

	High school graduate	Not a high school graduate	
Homeowner	221	119	340
Not a homeowner	89	71	160
	310	190	500

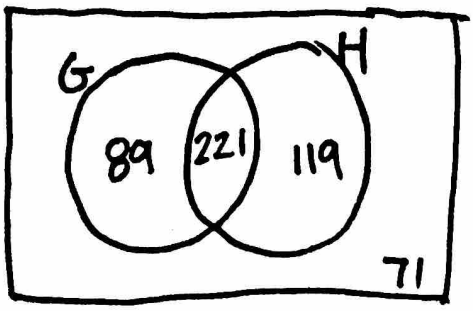
1. Explain in plain language what $P(G^c)$ means and find the probability.

The probability the person is not a high school graduate is 0.38. $P(G^c) = \frac{190}{500} = 0.38$

2. Explain why $P(G \text{ or } H) \neq P(G) + P(H)$. Then find $P(G \text{ or } H)$.

There are some people who graduated and own a home, so they were counted twice. $P(G \text{ or } H) = \frac{310}{500} + \frac{340}{500} - \frac{221}{500} = \frac{429}{500} = 0.858$

3. Make a Venn diagram to the right to display the sample space of this chance process.



4. Write the event "is not a high school graduate and is a homeowner" in symbolic form and find the probability.

$P(G^c \text{ and } H) = \frac{119}{500} = 0.238$