

Name: _____ Hour: _____ Date: _____



Can You Taco Tongue and Evil Eyebrow? Day 2



Are the events “Yes Taco Tongue” and “Yes Evil Eyebrow” independent?

1. Find class data from the previous lesson and fill in the following two-way table.

	Yes Evil Eyebrow	No Evil Eyebrow	Total
Yes Taco Tongue			
No Taco Tongue			
Total			

Suppose we randomly choose a student from class.

2. Find $P(\text{Yes Taco Tongue OR Yes Evil Eyebrow})$
3. Given that the person selected is a Yes Evil Eyebrow, what is the probability that they are a Yes Taco Tongue? Write as a fraction, a decimal, and a percent.
4. Given that the person selected is a No Evil Eyebrow, what is the probability that they are a Yes Taco Tongue? Write as a fraction, a decimal, and a percent.

Definition: Two events are **independent** if knowing whether or not one event has occurred does not change the probability that the other event will occur.

5. Are the events “Yes Taco Tongue” and “Yes Evil Eyebrow” independent? Explain.

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Consider the data for all Seniors at EKHS.

	Yes Evil Eyebrow	No Evil Eyebrow	Total
Yes Taco Tongue	180	300	480
No Taco Tongue	20	100	120
Total	200	400	600

6. Find each of the following using the data in the table. Write as a fraction, a decimal, and a percent.
- $P(\text{Yes Taco Tongue}) =$
 - $P(\text{Yes Taco Tongue} \mid \text{Yes Evil Eyebrow}) =$
 - $P(\text{Yes Taco Tongue} \mid \text{No Evil Eyebrow}) =$
 - Are “Yes Taco Tongue” and “Yes Evil Eyebrow” independent?
7. Fill in the table as if the events were INDEPENDENT.

	Yes Evil Eyebrow	No Evil Eyebrow	Total
Yes Taco Tongue			480
No Taco Tongue			120
Total	200	400	600

8. Find each of the following using the INDEPENDENT table. Write as a fraction, a decimal, and a percent.
- $P(\text{Yes Taco Tongue}) =$
 - $P(\text{Yes Taco Tongue} \mid \text{Yes Evil Eyebrow}) =$
 - $P(\text{Yes Taco Tongue} \mid \text{No Evil Eyebrow}) =$
9. What do you notice about your answers in #6 and #8?
10. Generalize: Complete the following statement using a formula.

Let $A \rightarrow \text{Yes Taco Tongue}$ and $B \rightarrow \text{Yes Evil Eyebrow}$

If events A and B are INDEPENDENT then...

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Conditional Probability and Independence

Important Ideas:

Check Your Understanding:

The Pew Research center randomly selected 100 mothers age 40 to 44 in 1976, 1994, and 2014 and asked each mother how many children they have. The two-way table summarizes the responses.

	Year			Total
	1976	1994	2014	
Number of children				
1 child	11	21	22	54
2 children	24	43	41	108
3 children	25	23	24	72
4+ children	40	13	13	66
Total	100	100	100	300

Suppose we randomly select one of the survey respondents. Define events C: have 4 or more children, S: 1976, N: 1994, and F: 2014.

1. Find $P(C | S)$. Interpret this value in context.
2. Given that the chosen mother was not surveyed in 1976, what's the probability that she has 4 or more children? Write your answer as a probability statement using correct symbols for the events.
3. Are the events "Surveyed in 1976" and "4 or more children" independent? Explain.