

**Conditional Probability**

Date: \_\_\_\_\_ Period: \_\_\_\_\_

*Remember that all probabilities need answers to be in fractions and percentages (round to the nearest whole).*

A survey of 1108 employees at a software company finds that 621 employees take a bus to work, 445 take a train to work, and 321 employees take only a train.

1. Fill out the following two-way table.

	<b>Train</b>	<b>No Train</b>	<b>TOTAL</b>
<b>Bus</b>			
<b>No Bus</b>			
<b>TOTAL</b>			

Find each of the following probabilities using your two-way table.

2.  $P(\text{bus} \cap \text{train}) =$

3.  $P(\text{train}^c) =$

4.  $P(\text{bus} \cup \text{train}) =$

5.  $P(\text{bus} \cup \text{train})^c =$

6.  $P(\text{bus}) =$

7.  $P(\text{bus}|\text{train}) =$

8.  $P(\text{train}|\text{no bus}) =$

9.  $P(\text{bus}|\text{no train}) =$

A survey of 4826 randomly selected young adults (aged 19-25) asked, "What do you think are the chances you will have much more than a middle-class income at age 30?"

10. Fill in the missing pieces of the two-way table

	Gender		
Opinion	Female	Male	Total
Almost no chance	96	98	
Some chance but probably not		286	712
A 50-50 chance	696	720	
A good chance			1421
Almost certain	486	597	1083
<b>Total</b>	<b>2367</b>		<b>4826</b>

11. Given that the person selected is male, what's the probability that he answered "almost certain"?

12. If the person selected said, "some chance but probably not," what's the probability that the person is female?

13.  $P(\text{"a good chance"} | \text{female}) =$

14.  $P(\text{"a good chance"}) =$

15. Which of the previous problems is a *marginal probability*?

16. Which of the previous problems is a *conditional probability*?

17. Give an example of a *joint probability* from the table above.

You have a standard 52-card deck. Find the following:

18. Find the probability of drawing a spade.

$$P(\text{spade}) =$$

19. Find the probability of drawing a face card.

$$P(\text{face card}) =$$

20. Find the probability of not selecting an ace (A).

$$P(A^c) =$$

21. Find the probability of not choosing a club-suited card.

$$P(\text{club})^c =$$

22. What is the probability that the card is black (B) and a jack (J)?

$$P(B \cap J) =$$

23. What is the probability that the card is red (R) and a 2?

$$P(R \cap 2) =$$

24. What is the probability of drawing a card that is a 5 or a 10?

$$P(5 \cup 10) =$$

Bonus: If you know that the card you selected is a 5, what is the probability that the card is a diamond?

$$P(\text{diamond} | \text{card is a 5}) =$$

