Name_____

Date_____

11.2 Independence

Two events are independent if $P(A) * P(B) = P(A \cap B)$. Use this formula to determine if the following probabilities are independent or not.

1. The P(A) = 0.42, P(B) = 0.25, and P(A ∩ B) = 0.32.

2. The P(A) = 0.5, P(B) = 0.2, and P(A ∩ B) = 0.1.

3. The P(A) = 0.5, P(B) = 0.32, and P(A ∩ B) = 0.16.

4. The P(A) = 0.25, P(B) = 0.25, and P(A ∩ B) = 0.25.

5.

	Dance	Sports	TV	Total
Men	2	10	8	20
Women	16	6	8	30
Total	18	16	16	50

The above table represents the favorite leisure activities for 50 adults. Use it to answer the following:

A. Find the probability of male.

B. Find the probability of TV.

C. Find the probability of P(male ∩ TV).

D. Is being male and watching TV independent?

6. Jaron has a dozen cupcakes. Three are chocolate with white frosting, two are chocolate with Yellow frosting, four are vanilla with white frosting, and three are vanilla with yellow frosting. Are cake flavor and frosting color independent?

The **conditional probability** formula is $P(A|B) = \frac{P(A \cap B)}{P(B)}$

7. A bakery sells vanilla and chocolate cupcakes with white or blue icing.

	White	Blue	Total
Vanilla	3	5	8
Chocolate	6	7	13
Total	9	12	21

Find:

A) P(Vanilla | Blue)

B) P(White | Chocolate)

C) Alex's favorite cupcake is chocolate with blue icing. What is the probability he will get his favorite cupcake if all the vanilla cupcakes have already been sold?

8. Use the **Senior** Venn diagram above to answer the following questions.
A) P(After School Job | Male)   B) P(Female | No After School Job)

C) P(No After School Job | Male)   D) P(Male | After School Job)

E) Is the probability of having an after school job given you are male
the same as the probability of being male given that you have an after
school job? Use the probabilities in A and D to justify your answer.

F) A student works at McTaco Chimes what is the probability the student is female?

9. Use the table to answer the questions.

	Bus	Private Car	Walk	Total
Male	146	166	82	394
Female	154	185	64	403
Total	300	351	146	797

Use the table above to answer the following questions.
A) P(Walk | Female)   B) P(Male | Private Car)   C) P(Bus | Male)   D) P(Female | Doesn't Walk)

E) What is the probability that Melissa rides the bus?
Write the conditional probability equation and then find
the probability.

F) Jordan walks to school. What is the probability Jordan
is male? Write the conditional probability equation and
then find the probability.

16. 30% of students prefer math class and 12% of students prefer winter. What would the p(math ∩ winter) have if these two events are independent.

17. 16% of students prefer The Utes and 10% of students prefer pickles. What would the p(Utes ∩ pickls) have if these two events are independent.

18. P(snow)=0.4 and p(tripping on your shoelace) = .02. Presuming they are independent events what is the p(snow ∩ tripping on your sholace)?

19. 33% of students prefer pepsi and 18% prefer a cookie. What would the P(pepsi ∩ cookie) have to be if these two events are independent?