Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Independent and Dependent Events**

**Independent Events**

* Event A occurring does NOT affect the probability of Event B occurring.
* ****
1. A coin is tossed and a 6-sided die is rolled. Find the probability of landing on the head side of the coin and rolling a 3 on the die.
2. A card is chosen at random from a deck of 52 cards. It is then replaced and a second card is chosen. What is the probability of choosing a jack and an eight?
3. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. After replacing it, a second marble is chosen. What is the probability of choosing a green and a yellow marble?
4. A school survey found that 9 out of 10 students like pizza. If three students are chosen at random with replacement, what is the probability that all three students like pizza?

**Dependent Events**

* Event A occurring AFFECTS the probability of Event B occurring.
* Usually you will see the words “WITHOUT REPLACING.”
* ****
1. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. A second marble is chosen without replacing the first one. What is the probability of choosing a green and a yellow marble?
2. An aquarium contains 6 male goldfish and 4 female goldfish. You randomly select a fish from the tank, do not replace it, and then randomly select a second fish. What is the probability that both fish are male?
3. A random sample of parts coming off a machine is done by an inspector. He found that 5 out of 100 parts are bad on average. If he were to do a new sample, what is the probability that he picks a bad part and then, picks another bad part if he doesn’t replace the first?

**How to Determine If 2 Events Are Independent:**

* Substitute in what you know in to **P(A ∩ B) = P(A) ⚫ P(B)** and check to see if left side equals right side.
	+ If it’s equal, then it’s independent.
	+ If it’s not equal, then it’s not independent (or dependent).
1. Let event M = taking a math class. Let event S = taking a science class. Then, M and S = taking a math class and a science class. Suppose **P(M) = 0.6**, **P(S) = 0.5**, and **P(M and S) = 0.3**. Are M and S independent?
2. In a class, 60% of the students are female. 50% of all students in the class have long hair. 45% of the students are female and have long hair. Of the female students, 75% have long hair. Let F be the event that the student is female. Let L be the event that the student has long hair. One student is picked randomly.

Are the events of being female and having long hair independent?