Probability WS 5 Due: September $15^{th}$ start of class

Name:_____

**Definition:** The set of all possible outcomes in a random experiment is called the

_____

Describe the sample space for the following random experiments:

1. Flipping a fair coin twice.

2. Three dice are rolled and the sum is computed.

3. Choosing 2 marbles from a bag with 2 red marbles, 2 blue marble, and 1 green marble.

**Definition:** The **fundamental counting principle** says that if there $n$ outcomes from one event and $m$ outcomes from the another, then there are

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total possible outcomes.

**Definition:** If all outcomes are equally likely, then the **probability** of an event occurring is

$$P(E) = \frac{\text{number of ways the event can occur}}{\text{number of possible outcomes}}.$$

3. What is the probability of rolling a 2 on a fair six sided die?

4. What is the probability of getting two heads in a row when flipping a coin twice?

5. What is the probability of pulling two red marbles from a bag with 2 red marbles, 2 blue marbles, and 1 green marble?

6. What is the probability of rolling an even number or a one?

**Definition:** Two events are said to be **disjoint** if they cannot both happen. The probability of disjoint events $A$ or $B$ occurring is

$$P(A \text{ or } B) = \underline{\qquad\qquad\qquad\qquad}.$$

7. What is the probability of drawing a jack or a queen from a deck of cards?

8. What is the probability of rolling a number greater than 3 or an even number?

**Definition:** The probability of two events (not necessarily disjoint) $A$ or $B$ occurring is

$$P(A \text{ or } B) = \underline{\qquad\qquad\qquad\qquad}.$$

9. What is the probability of rolling a number greater than 3 or an even number?

10. What is the probability of drawing a jack or a queen from a deck of cards?

## Class Activity:

11. What is the sample space for the following event: a six sided die is rolled.

12. What is the sample space for the following event: two different integers between 1 and 5 are chosen and listed in increasing order.

13. Suppose that $P(A) = .4$, $P(B) = .3$, and $P(A \text{ and } B) = \frac{1}{4}$. Are $A$ and $B$ disjoint events?

14. What is the probability of getting at least one heads if you flip a coin three times?

15. In problem 12., what is the probability of the first number being 2 or 3? What about the probability of the first number being 5?