**Unit 8 #1 Theoretical & Experimental Probability**

**What is probability?**

* The probability of an event happening in a random experiment is the \_\_\_\_\_\_\_\_\_\_\_\_ (fraction) of the number of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** as the numerator over the \_\_\_\_\_\_\_\_\_\_\_\_\_ number of outcomes as the denominator.

What is the probability of a penny landing heads up when it is tossed?

Successful Outcomes 🡪 \_\_\_\_\_\_\_\_ So, there is a $\frac{1}{2}$, or \_\_\_\_\_\_ out of \_\_\_\_\_\_ chance

Total # of Outcomes 🡪 of flipping a coin and getting a “head.”

Example Problem 1:

What is the probability that a green candy will be pulled out on the first try?

Blue candy?

Red candy?

Example Problem 2: A box contains 20 marbles – 12 red, 3 blue, and 7 green. Write each *ratio* in lowest terms.

 blue marbles to green marbles green marbles to all the marbles

 red marbles to blue marbles red marbles to all the marbles

|  |  |
| --- | --- |
| **Define Theoretical Probability** | **Give the formula for theoretical probability** |
| the number of possible ways an event can happen compared to all possible outcomes. It is based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |  |

Example Problem #3 What is the theoretical probability of getting a sum that is an odd number on one roll of two fair number cubes?

Practice Problems:

1. Tierra rolls a fair dice. What is the theoretical probability that she will roll a number greater than 4?
2. A bucket contains 15 blue pens, 35 black pens, and 40 red pens. You pick one pen at random. Find each theoretical probability:
	1. *P*(black pen) b) *P*(blue pen or red pen)
3. *P*(not a blue pen) d) *P*(black pen or not a red pen)

|  |  |
| --- | --- |
| **Define Experimental Probability** | **Give the formula for experimental probability** |
| the ratio of actual outcomes to trials performed. Experimental probability is based on an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |  |

Example Problem #4 A softball player got a hit in 20 of her last 50 times at bat. What is the experimental probability that she will get a hit in her next at bat?

Practice Problems:

1. A baseball player got a hit in 12 of his last 40 at bats. What is the probability that he will get a hit in his next at bat?
2. A pitcher struck out 8 of the last 32 batters that he faced. What is the probability that he will strike out the next batter that he faces?