

## ML #1: Likelihood of Event (Unit 7 – Math 7 and Math 7 PLUS)

- **Probability** is the measure of how likely an event is to happen (can be a percent or fraction)
- **Outcome** is a possible result.
- **Experimental Probability**
  - Probability determined through an experiment.
  - Ratio of number of times an event occurs to the total number of trials

$$P(\text{event}) = \frac{\text{times an event occurs}}{\text{total \# of trials}}$$

### EXAMPLES

- 1) Sam rolled a number cube 50 times. The number three appeared 10 times. Then the experimental probability of rolling a three is 10 out of 50 or 20%.
- 2) A coin is tossed 60 times. 27 times head appeared. Find the experimental probability of getting heads.

- **Theoretical Probability**

- It is the likeliness of an event happening based on all the possible outcomes.
- The ratio for the probability of an event 'P' occurring is  $P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$ .

$$P(\text{event}) = \frac{\# \text{ of favorable outcomes}}{\# \text{ of possible outcomes}}$$

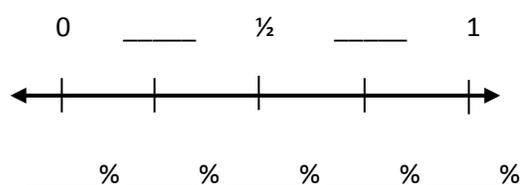
### EXAMPLES

- 1) From the letters A, E, I, O, U the theoretical probability of selecting the letter E is  $\frac{1}{5}$
- 2) A coin is tossed on a standard 8×8 chessboard. What is the theoretical probability that the coin lands on a black square?

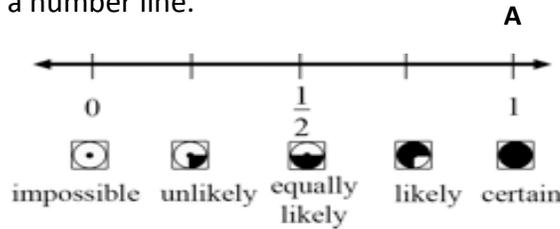
- **Likelihood**

- It is possible to have a **100% probability** of the event which makes it "**certain**" to happen.
- It is also possible to have a **zero percent chance** which would make the event "**impossible**".

For the following number line, fill in each blank.



- We can describe these probabilities using the categories shown below depending on where they would fall on a number line.



TRY IT

- If possible, write a ratio to represent each probability below
- List the given letter above the number line. Problem A is done for you to use as an example.
- Next, determine if each event is impossible, unlikely, equally likely, likely, or certain. You might not be able to have a ratio represent each scenario, but you CAN determine the likelihood of the event using the categories shown on the number line.

A) If you roll a die you will get a number less than 7.	B) If you roll a die you will get an odd number.
C) Jodi has dance class on Tuesday afternoons from 4:00-5:30. How likely is it Jodi will be at the mall on a Tuesday afternoon from 4:00-5:30?	D) A bag has 12 dimes and 12 pennies. How likely is it you will pull a dime from the bag?
E) You must be 15 to obtain a learner's permit to drive. Emily is 13 years old. How likely it is Emily has a learner's permit?	F) The club volleyball team is made up of 7 boys and 4 girls. How likely is it that the first player chosen at random will be a girl?
G) Cards numbered 1-8 are in a box. How likely is it that the card you will pull out will be a number greater than 2?	H) Cards numbered 1-8 are in a box. How likely is it that the card you will pull out will be a number less than 4?

- **IMPORTANT- The sum of all possible outcomes is 1.**

**EXAMPLE** The probability of tossing a coin and getting heads is  $\frac{1}{2}$  the probability of tails is  $\frac{1}{2}$ .

$$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1$$

**TRY IT:**

- 1) There are 3 choices of jellybeans – grape, cherry and orange. If the probability of getting a grape jellybean is  $\frac{3}{10}$  and the probability of getting cherry is  $\frac{1}{5}$ , what is the probability of getting orange?

$$\frac{3}{10} + \frac{1}{5} + x = 1$$

- 2) You have 3 marbles – green, yellow, and blue.  $\frac{2}{3}$  of the marbles are blue,  $\frac{1}{6}$  of the marbles are green, what probability of the marbles are yellow?

- 3) There are 4 color Skittles - yellow, purple, red and orange. If the probability of getting an orange is  $\frac{3}{5}$ , yellow is  $\frac{1}{15}$ , and red is  $\frac{1}{5}$ , what is the probability of getting purple?

- 4) A spinner has four unequal parts. Lori spun the spinner 20 times. The spinner landed on red 3 times, blue 4 times, yellow 7 times and green 6 times. Using this data, what is the most likely outcome on the next spin?

**CARNIVAL COLLECTION**

<b>BOOTH</b>	<b># Ways to Score</b>	<b># Possible Outcome</b>	<b>Theoretical Probability</b>	<b>Expected #of points in 10 turns</b>
<b>Get Ahead</b>				
<b>Lucky 3</b>				
<b>Evens or Odds</b>				
<b>Pick a Number</b>				
<b>Coin or Cube</b>				
<b>Teens Only</b>				