UNIT 6 LESSON 1 – THEORETICAL AND EXPERIMENTAL PROBABILITY

✓ The **Theoretical Probability** of an event is the expected probability and can be found with a formula.

- Theoretical Probability of an event is:

$$\frac{\text{Number of possible favorable outcomes}}{\text{Total number of possible outcomes}}$$

✓ The **Experimental Probability** of an event is determined by carrying out a simulation or an experiment.

- The experimental probability of an event is:

$$\frac{\text{Number of times desired outcomes occur}}{\text{Number of trials in the experiment}}$$

✓ If you flip a coin, what is the theoretical probability that you will flip a heads? $\frac{1}{2}$

✓ If a coin is flipped 10 times, how often should you get a heads? $\frac{5}{10} = \frac{1}{2}$

- Is this theoretical or experimental probability? theoretical

✓ If you perform an experiment by flipping a coin 20 times, will you always get heads 10 times? Why or why not?

- Is this theoretical or experimental probability?

No, because 20 times will not automatically give me 50%. External factors may also play a part.

Experimental

✓ Suppose your performed 2 experiments. In the first one, you flipped a coin 20 times and counted the number of times heads came up. In the second experiment, you flipped a coin 2,000 times and counted the number of times heads came up. In which experiment are you more likely to get heads 50% of the time? Why?

2,000 times. The more times will give an answer closer to the theoretical probability.

✓ In experimental probability, as the number of trials increases, the experimental probability gets closer to the theoretical probability (Law of Large Numbers)

✓ Think about it! Which experiment would be closer to the theoretical probability?

- Mary rolls 2 dice 6 times to see how often she gets a sum of 4.
- Mary rolls 2 dice 60 times to see how often she gets a sum of 4.

Second choice: Mary rolls 2 dice 60 times. Law of Large Numbers