Tossing Coins

Tossing_Coins.tns

Name _____

Class _____

Problem 1 – Simulating Tossing Coins

The probability of obtaining a tail with a coin toss is ½. If a coin is tossed twice, what is the probability that both outcomes are tails? Heads? Or one of each? You will investigate this problem using a simulation.

- What do you think will be the probability of tossing no tails? One tail? Two tails?

Let 0 represent the coin landing 'heads' and 1 represent the coin landing 'tails'. Use the spreadsheet on Page 1.7 to conduct your simulations.

Step 1: To simulate 100 trials of the first coin toss, enter **=randInt(0,1,100)** in the grey cell of Column A (marked by a diamond), and then press enter.

Step 2: To simulate 100 trials of the second coin toss, enter the same formula for Column B.

Step 3: To calculate the number of tails for each trial, enter **=a + b i**n the grey cell of Column C, and then press enter.

- The cells in Column C will display the outcomes of the 100 trials of two coin tosses — a 0 means no tails, a 1 means one tail, and a 2 means two tails.
- Scroll down to survey the results. What is the number of tails that occurs most often? Least often?

Step 4: Graph the results of the two tosses. With your cursor in Column C, select **MENU > Data > Quick Graph**. Change the dot plot that appears to a bar graph by selecting **MENU > Plot Properties > Force Categorical X** and then **MENU > Plot Type > Bar Chart**.

Step 5: Calculate the experimental probabilities for your data and enter them into the table below.

Step 6: Combine data with your other group members, and calculate the experimental probabilities. Then, calculate the experimental probabilities for the whole class. Enter all probabilities into the table.

	No Tails	One Tail	Two Tails
Individual Results			
Group Results			
Class Results			

Conclusions:

- Did your results match your predictions? Why or why not?

- Why do you think the probability of getting one tail is higher than getting no tails or two tails?

- What is the sample space—the set of all possible outcomes—for tossing a coin twice?

- Using the sample space, calculate the three theoretical probabilities for tossing a coin twice.

$$\text{Theoretical Probability} = \frac{\text{number of outcomes for event}}{\text{total number of outcomes}}$$

No tails: _____

One tail: _____

Two tails: _____

- As you combined your results with the class, how did the experimental probabilities compare to the theoretical probabilities?

- Explain why the computation for the probability of an outcome of one tail is different from the other computations.