**Plinko!**

Problem 1 – Simulate the Game

In the game Plinko, a disk is dropped from the top of a game board. It bounces either left or right off pins as it moves down the board where it lands in 1 of 5 numbered slots.

1. Suppose the disk is dropped from the middle slot each time and the disk has an equal probability of bouncing left or right each time.

    What do you think the distribution of results will be in 10 trials?

    _____

    _____
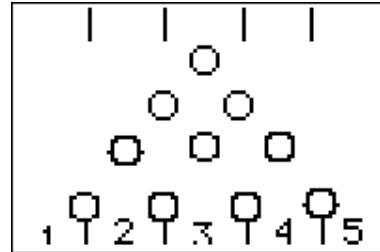
2. Set up the random number generator. Enter a unique number instructed by your teacher on the Home screen. Then press STO▶ MATH ▶ ▶ ENTER ENTER.

3. Next, generate a 4-digit random number that determines the direction the disk bounces on each row. Decide if an odd number means a left or right bounce. Then an even number means the opposite.

    Odd = _____ bounce   Even = _____ bounce
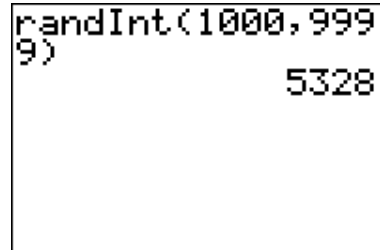
4. Describe the direction of movements of the disk for the number in Question 3.
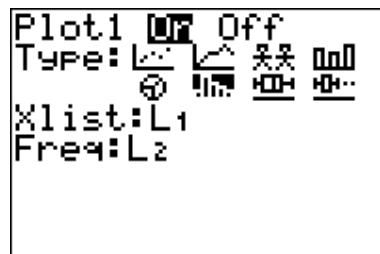   _____

5. Which slot did the disk land in? _____

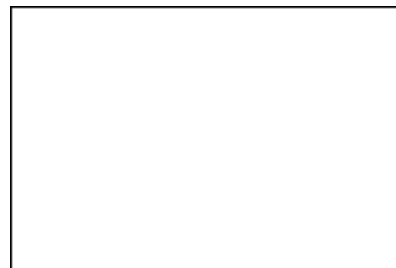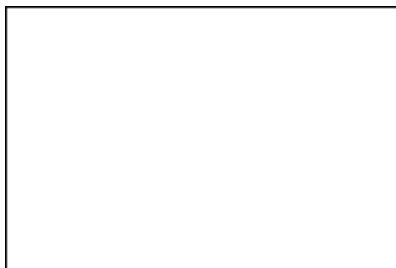6. Run nine more trials and keep track of the slot each disk lands in. _____
    _____

7. Enter the slot number in **L1**. Enter the number of times the disk landed in each slot in **L2**.

    Create a histogram. Press 2nd Y= and select **Plot1**. Change the settings to those shown at the right.

    Press ZOOM and select **ZoomStat**.

8. Draw your histogram (of 10 trials) and a histogram of the class data below.

9. On the Home screen, calculate the experimental probability of the disk landing in each number slot for the class.

Slot 1: _____   Slot 2: _____   Slot 3: _____   Slot 4: _____   Slot 5: _____

Problem 2 – Theoretical Probability

Now you will determine the theoretical probability of the disk landing in each slot.

10. What are all the possible combinations of bounces for the disk? For example, it could go LLLL or LRLR. Find the other combinations.

_____

_____

_____

11. How many total combinations exist? _____

12. Given the possible movements of the disk from Question 10, complete the following table.

Movements	Slot
4 Lefts	1
___ Lefts, ____ Rights	
___ Lefts, ____ Rights	
___ Lefts, ____ Rights	
4 Rights	5

13. Now, calculate the theoretical probabilities of the disk landing in each slot.

Slot 1: _____   Slot 2: _____   Slot 3: _____   Slot 4: _____   Slot 5: _____

14. How do the results from your 10 trials (Questions 5 & 6) compare to the theoretical probabilities?

_____

_____

15. How do the results of the class data (Question 8, graph 2) compare to the theoretical probabilities?

_____

_____