

Period: \_\_\_\_\_

(A study of torque, linear and inverse relationships)

Setup:

Question 1: How far away is the cup from the fulcrum (in cm)?

Question 2: How far away is the second cup from the fulcrum (in cm)?

4: Place 10 pennies in the first cup. Find the number of pennies needed to be placed in the second cup to balance the system again. Fill in the following table for when the system is balanced:

A blank 10x10 grid for graphing, consisting of 10 columns and 10 rows of squares.

Question 3: Is the graph linear? \_\_\_\_\_.

The **slope** of a line is the measure of its steepness. It is measured by picking two points on the line and finding the ratio (expressed as a fraction) of the change in the y- coordinates to the change in the x-coordinates.

$$slope = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

point 1 (  $\begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$  )      point 2 (  $\begin{pmatrix} x_2 \\ y_2 \end{pmatrix}$  ) Hint: points further apart work better.

7: Calculate the slope of the line.



Suppose my line for a set up was  $y = \frac{5}{3}x + 7$ . Remembering that x is cup one and y is cup 2. Find the number of pennies that would need to go into cup 2 to balance it. (This is find the values that make the equation true.

| Pennies in cup 1 (x) | Pennies in cup 2 (y) |
|----------------------|----------------------|
| 0                    |                      |
| 6                    |                      |
| 9                    |                      |
| 12                   |                      |

Rewrite your equation from question 8 on the previous page.

$$y =$$

Use it to predict the number of pennies needed to balance the lever and complete the chart.

| Pennies in cup 1 (x) | Pennies in cup 2 (y) |
|----------------------|----------------------|
| 2                    |                      |
| 4                    |                      |
| 8                    |                      |
| 26                   |                      |

Test your results for one of these points by adding the pennies to the appropriate cups.

Did it work ? \_\_\_\_\_ If not why do you think it did not work?

There is a relationship between the slope of our line and the distances of the cups from the fulcrum. What is the relationship?