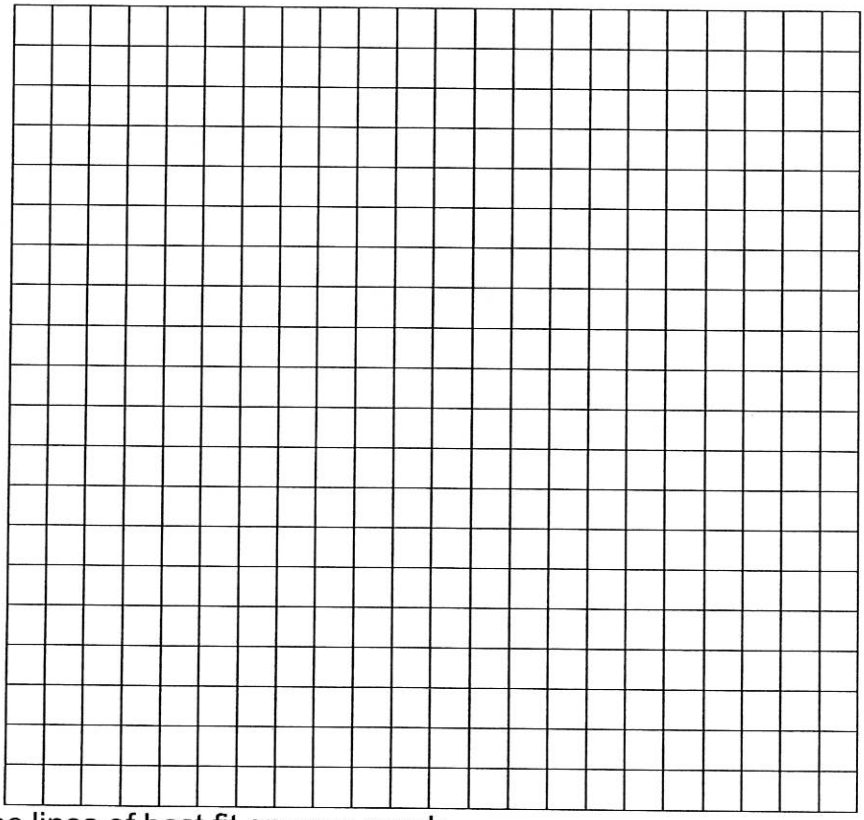
ALL TIED UP IN KNOTS!
(Solving a System of Linear Equations)

Materials Needed: 2 unequal lengths of different size rope
Meter stick
Graph Paper
Graphing Calculator

Measure the length of your first rope, and then tie one knot in your rope and measure the rope's length. Continue this process, measuring the length after each knot until you can no longer tie a knot easily. Repeat the process for the other rope as well. (Have the same group member tie each knot to encourage consistency.) Record your data in this table:

Number of Knots	Length (skinny rope) in cm	Length (fat rope) in cm
0		
1		
2		
3		
4		
5		

1. Make a scatterplot of your data of the length of your rope vs. its number of knots. There should be 2 sets of data points plotted. Label the axes and increments appropriately.



2. Sketch the lines of best fit on your graph.

3. Do they intersect? _____ If so, where? _____

4. What does the point of intersection (if there is one) mean? _____

_____

_____

5. Can you physically prove what you said in #3 and 4 to your group members? If so, show them and be prepared to share with the whole class. What did you do to prove your point?

6. What would be the situation for the point of intersection to be on the y-axis?

_____

_____

7. Could the thicker rope be the shorter rope in this experiment, and would it still work? Explain why or why not: _____

_____

_____

8. Using your calculator (or by hand) and working with your group, find the equations of these two lines. (round all numbers to 3 decimal places)

Eq of line (thicker rope):

Eq of line (thinner rope):

What do the slopes of each equation represent? _____

What do the y-intercepts represent? _____

9. Solve this system of equations algebraically and comment on the closeness of this answer to yours in number 3. Why is it different (if it is)?