

Analysis

4. Look at the graphs of the lines. At what coordinate point do the lines intersect? What does the x-value of this point mean? What does the y-value of this point mean?

5. Now solve the system of equation given by the equations of the two lines using the substitution method. Do you get approximately the same result as the graphical method?

Test your model:

Now you need to test your equations. Use the same kind of ropes: one thin rope and one thick rope. The new ropes should not be the same length as each other and should not be the same length as the original ones. The thicker rope needs to be 3 to 5 inches longer than the thinner rope. I just cut a few inches from each of my original ropes to do this test.

6. Write two new equations for these new ropes. You should not collect data again. Think of what should stay the same in your equations and should change.

Equation for the thick rope:

Equation for the thin rope:

7. Solve this new system of equations using substitution. Tie the number of knots given by the solution in each rope. Are they the same length?

What to turn in:

Your report should include the following:

1. **Introduction:** explain the purpose of this activity
2. **Describe** the procedure for the experiment. Did you run into any problems?
3. **Data, Graph and Equations:** include the two data tables, the graph showing the two lines of best fit, your calculations for finding the equations of the two lines and the answers to the questions on page 1.
4. **Analysis:** Answer question number 4. Show all the steps to the solutions to the system of equation for question 5.
5. **Test:** Discuss how you came up with your two new equations without collecting new data. Explain what stayed the same in the equations and what changed from your first set of equations. Show all the steps to the solution of the new system of equations and discuss how well your model worked in finding the number of knots that makes the ropes equal length.
6. Include **pictures** of the experimental materials, your group members gathering the data and of the final test.
7. **Conclusions:** explain in a few sentences what math you learned here, what particular concepts and problem solving strategies helped you solve these problems, how can you connect this to anything outside the classroom?

To write your report, use any combination of written, pictures and video explanations.

Here is a link to a video that shows how to do this: <http://screencast.com/t/dKmdhAoN>