Day 22: Ropes and Slopes!   **#22**

Remember the activity "Hold the Rope!"? We will dig a little deeper into the mathematics of the activity today. Remember that groups measured the length of the rope as you tied knots in the rope and modeled the length with a linear equation. Below are 4 pictures of different types of rope/string.

A	B	C	D
This is a thick rope. It is 8 feet long	This is another piece of the same thick rope. It is 12 feet long	This is a thin piece of string. It is 30 inches long.	This is another piece of the same thin string. It is 30 yards long.

Reminders: 12 inches = 1 foot, 3 feet = 1 yard, y=mx+b (m = slope/change, b = start)

1. Which piece of rope or string from above is the LONGEST? Which is the SHORTEST? Explain how you know.

2. Predict your answer without using an equation: Which rope/string will be the SHORTEST after you tie 10 knots? Explain how you know.

3.   Imagine you could tie 100 knots without the rope getting all messed up. Predict your answer without using an equation. Which rope/string will be the SHORTEST after you tie 100 knots? Explain how you know.

4. Mr. Maurer worked out the equations to these ropes, but he forgot which equation goes with which rope. Match the equations below to the pictures of ropes from the beginning. For each equation y = the length of the rope (in inches), and x = the number of knots.

Equation	$y = -3.5x + 144$	$y = -0.5x + 30$	$y = -0.5x + 1080$	$y = -3.5x + 96$
Rope (A,B,C, or D)				

5. Mr. Maurer graphed all of those equations on Desmos, and here's what showed up. Match each graph to the equations from above. There is one equation that is missing.
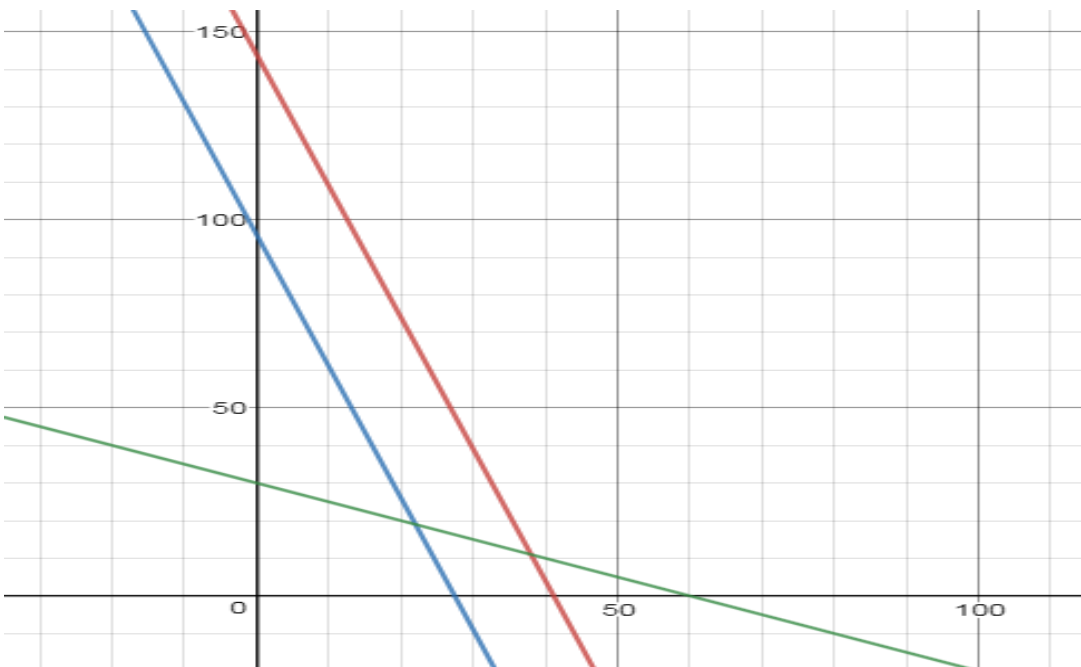
6. Why are there only 3 lines shown? Where would the last line go? Why didn't he just put all 4 lines in one picture?

7. How many knots would need to be tied for the 8-foot long thick rope to be the same length as the 30-inch piece of string? How long would the rope be?

8. How many knots would need to be tied for the 8-foot long thick rope to be the same length as the 12-foot long thick rope? How long would the rope be? Does your answer make sense?