Expanding Equator

Write a complete solution including words that explain your process, mathematics to support your conclusions, and diagrams where appropriate. A person who has never seen this problem should be able to read and follow your work.

Imagine a string is stretched around the Earth at the equator (we will assume this string is in the shape of a circle). Now imagine that people all along the equator and dolphins in the ocean (I hear they are very smart) lift the string so it is 5 feet above the equator.

How much additional string is required so the string will hover 5 feet above the entire equator?

How much additional string is required so the string will hover 6 feet above the equator?

Complete the table where x is the distance the string is hovering above the equator and y is amount of additional string required.

x	**y**
5	
6	
7	
8	
9	
10	

Create a graph of the data. Is the relationship between x and y linear, quadratic, or neither?

Let r be the radius of the earth in feet. Write an equation solved for y in terms of r and x.

Use your equation to verify two of the ordered pairs in the table.

Does your equation support your conclusion about the relationship between x and y? Explain.