We began with the basic equations for this scenario that we were given during the simulations, first being the speed of the wave:

|  |  |
| --- | --- |
|  | (1) |

where is the velocity of the wave in meters per second, is the tension on the string in Newtons, and is the linear density of the string in kilograms per meter; then the wavelength:

|  |  |
| --- | --- |
|  | (2) |

where is the wavelength for the nth harmonic, is the length of the string, and is the number of the harmonic; and finally the frequency:

|  |  |
| --- | --- |
|  | (3) |

where is the frequency of the nth harmonic. Since we were adjusting the frequency and finding a value for n, our independent variable was and our dependent was . To get a function of our independent for our dependent we began by substituting the equation for into that for :

|  |  |
| --- | --- |
|  | (4) |

Since we were creating tension with a pulley, we defined as

|  |  |
| --- | --- |
|  | (5) |

where is the mass of the weight at the end of the pulley. With this substitution we were able to derive an equation for a fit line:

|  |  |
| --- | --- |
|  | (6a) |
|  | (6b) |
|  | (6c) |

The term consisted entirely of constants, being measured at 1.46m, being 0.15kg, and being the acceleration due to gravity 9.81m/s\*s, which simplifies the equation to

|  |  |
| --- | --- |
|  | (7) |