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MAMS Physics Acceleration of an Incline Plane
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ANALYSIS

Equation Used: $v^2=v_0^2+2a\Delta x$, where $v_0=0$

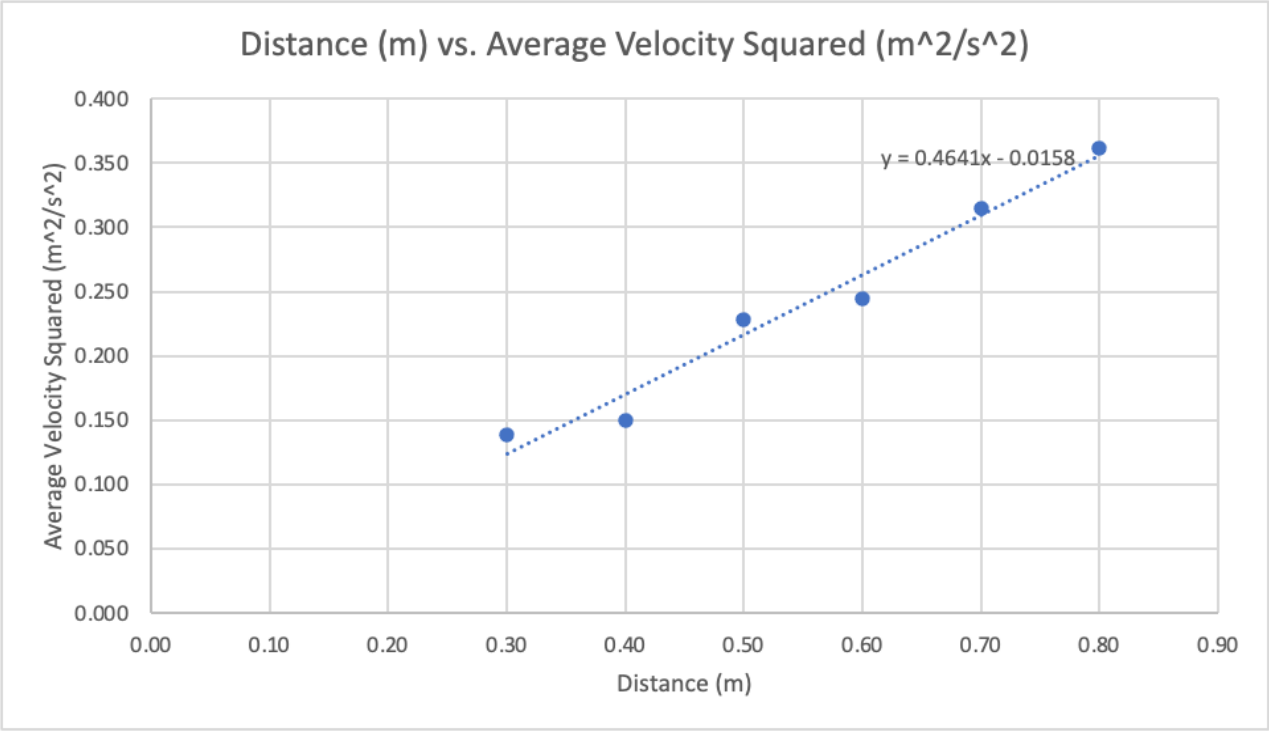
In the following graphs, we needed a linear equation. To facilitate this, I squared the average velocities.

By doing so, we received an equation following the format of y=mx:

$$v^2=2a\Delta x$$

Incline I:

- Height: 0.04 m
- Ramp Length: 1.065 m



Finding Acceleration:

Actual (the ‘b’ value in the equation is close enough to 0 to be disregarded):

$y=mx \rightarrow y=0.4641x \rightarrow y=2a\Delta x$

$2a=0.4641 \rightarrow a=0.23\ m/s^2$

Expected ($\sin(\theta)$ is equal to $\frac{0.04}{1.065}$- in other words, opposite over adjacent):

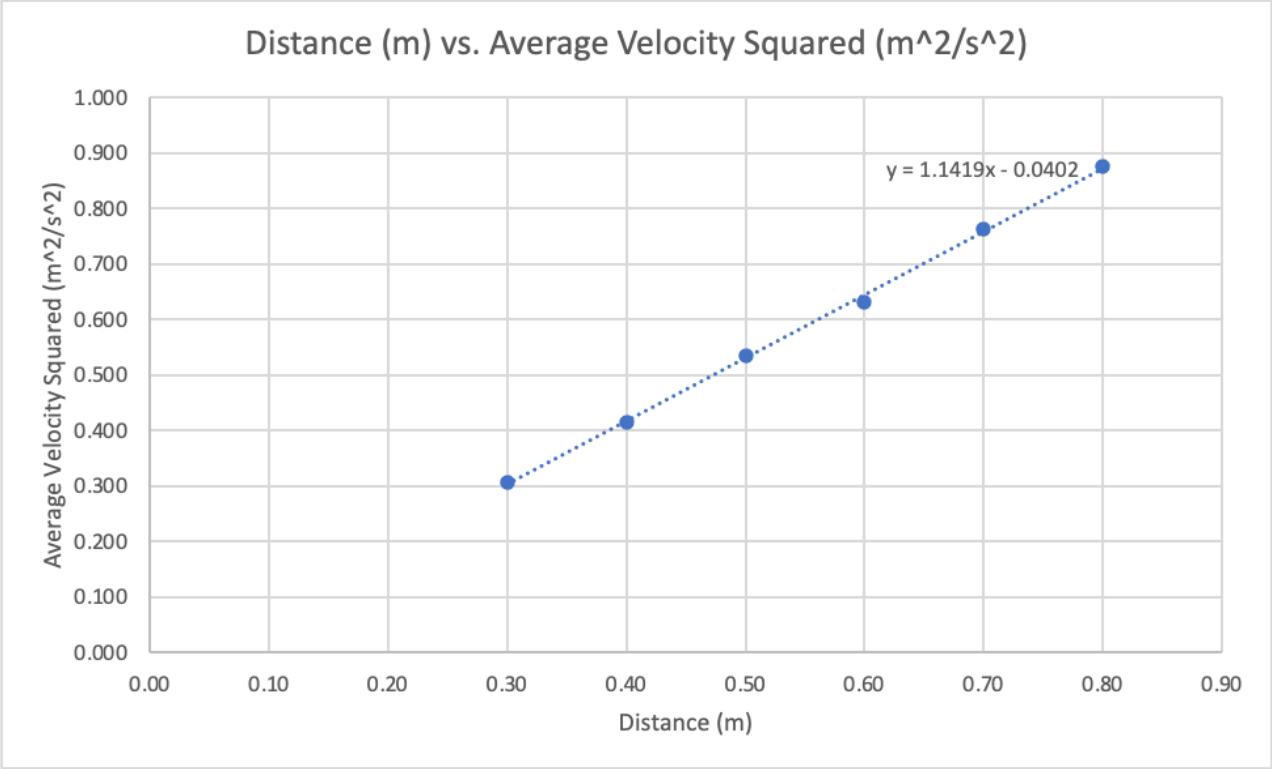
$a=g\sin(\theta) \rightarrow a=(9.8)(\frac{0.04}{1.065})=0.36\ m/s^2$

Percent Error:

$\frac{0.23-0.36}{0.36}(100)\%= -36.11\%$

Incline II:

- Height: 0.08 m
- Ramp Length: 1.065 m



Finding Acceleration:

Actual (the 'b' value in the equation is close enough to 0 to be disregarded):

$y=mx \rightarrow y=1.1419x \rightarrow y=2a\Delta x$

$2a=1.1419 \rightarrow a=0.57\ m/s^2$

Expected ($\sin(\theta)$ is equal to $\frac{0.04}{1.065}$- in other words, opposite over adjacent):

$a=g\sin(\theta) \rightarrow a=(9.8)(\frac{0.08}{1.065})=0.72\ m/s^2$

Percent Error:

$\frac{0.72-0.57}{0.72}(100)\%= 20.83\%$

Conclusion:

Our results were as follows: Incline I had an expected acceleration of 0.36 m/s^2 and an actual acceleration of 0.23 m/s^2, with a resulting percent error of -36.11%. Incline II had an expected acceleration of 0.57 m/s^2 and an actual acceleration of 0.72 m/s^2, with a resulting percent error of 20.83%. For the first incline, the actual acceleration was likely lower than the expected acceleration due to unconsidered variables such as friction or unsteadiness when leaving the cart. On the second incline, the percent error was less than before– this could've been due to a familiarity with the overall method of the experiment. This time, the percent error was positive as well. This could've been due to a slight push by the hand caused by the steepness of the slope.