ANALYSIS

Incline 1 angle = 4.1 degrees

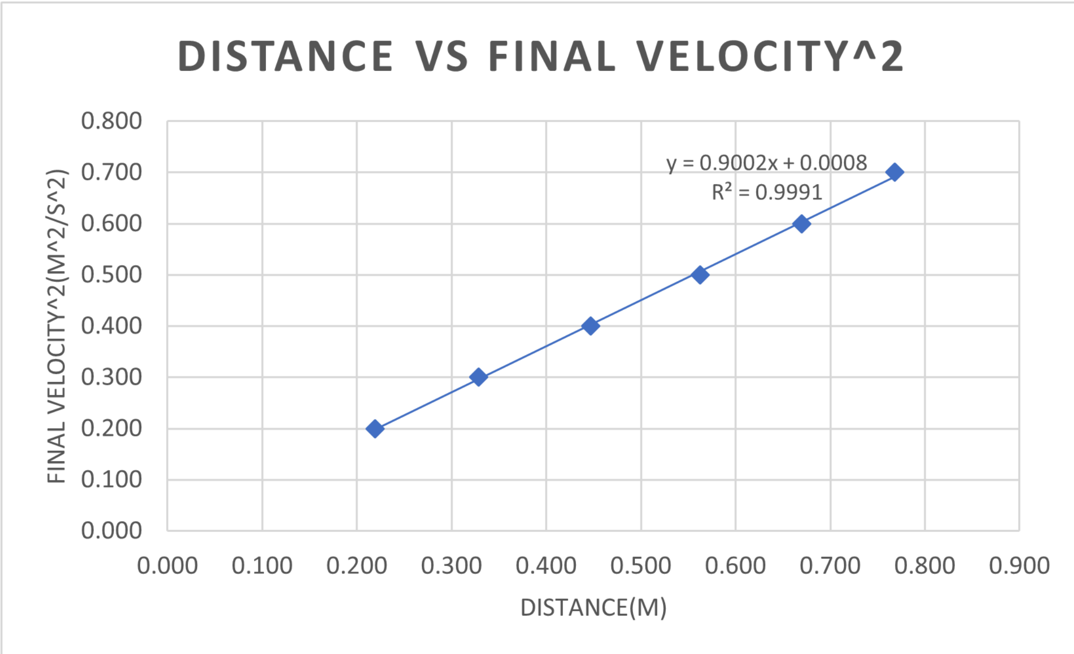
Distance (m)	Velocity Trial 1 (m/s)	Velocity Trial 2 (m/s)	Velocity Trial 2 (m/s)	Average Velocity (m/s)
0.200	0.466	0.468	0.470	0.468
0.300	0.571	0.575	0.573	0.573
0.400	0.669	0.668	0.668	0.668
0.500	0.752	0.747	0.751	0.750
0.600	0.818	0.823	0.814	0.818
0.700	0.883	0.875	0.871	0.876

Using the equation $v^2 = v_0^2 + 2a\Delta x$

By substituting v_0=0 we get $v^2 = 2a\Delta x$

To linearize this, we can set $v^2 = y$ and $\Delta x = x$ which gives $y = 2ax$ where $2a$ is the slope of the graph

Solving for a, we get the experimental acceleration



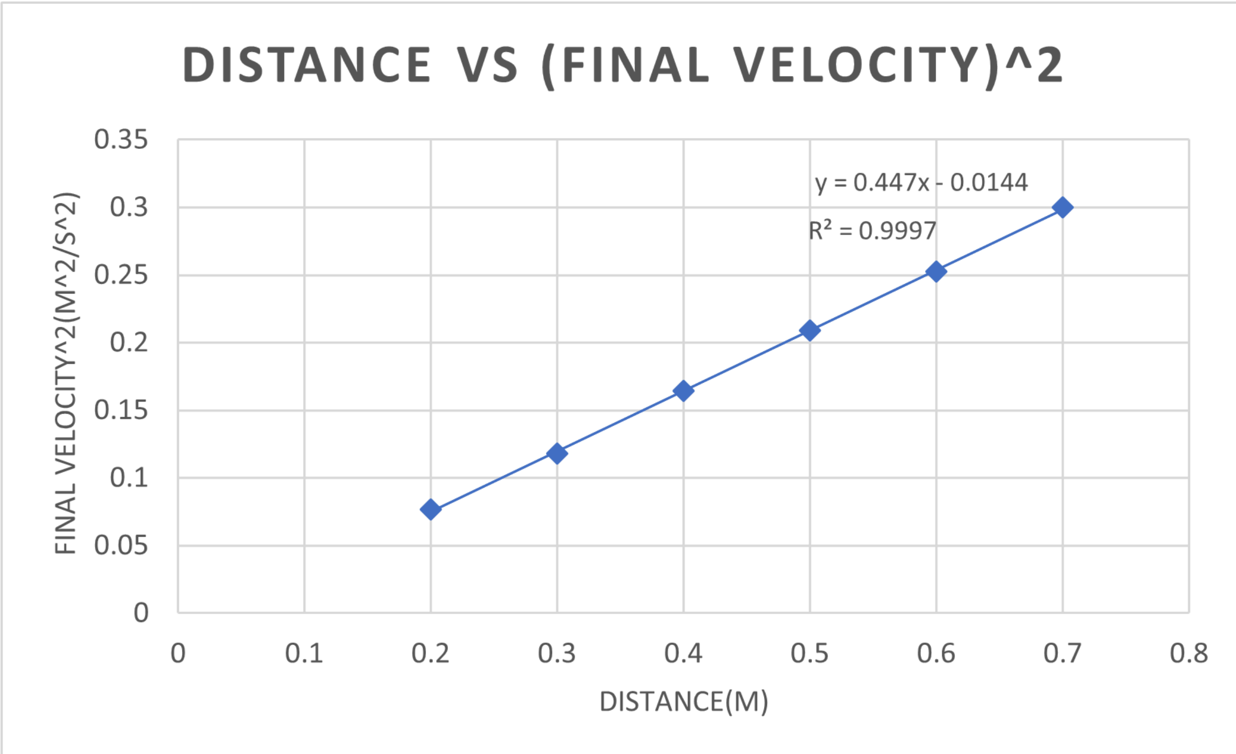
$2a = 0.9002$

$a = 0.4501\, m/s^2$

<u>Incline 2</u> angle=2.05 degrees

Distance (m)	Velocity Trial 1 (m/s)	Velocity Trial 2 (m/s)	Velocity Trial 2 (m/s)	Average Velocity (m/s)
0.200	0.275	0.275	0.280	0.277
0.300	0.341	0.344	0.346	0.344
0.400	0.405	0.403	0.408	0.405
0.500	0.456	0.460	0.456	0.457
0.600	0.501	0.502	0.504	0.502

0.700	0.549	0.547	0.547	0.548



Similar to the calculation of acceleration in incline 1, we can set $2a = 0.447$

$a = 0.2235\, m/s^2$

<u>Expected acceleration</u>

Assuming no friction, we can say that $a = gsin(theta)$ where theta is the angle formed by the incline.

For incline 1:

$a = 9.8sin(4.1) = 0.7\, m/s^2$

For incline 2:

$a = gsin(2.05) = 0.35 m/s^2$

Percent Error

The percent error is the difference of the expected acceleration and the experimental acceleration divided by the expected acceleration

For incline 1:

$(0.4501 - 0.7)/0.7 = 36\%$ error

For incline 2:

$(0.2235 - 0.35)/0.35 = 36\%$ error

CONCLUSION

We believe that the 36% error is reasonable given that friction was neglected throughout the experiment. There were also some key sources of error which could be held accountable for a 36% deviation.

Some sources of error include the release of the cart. While we were holding the cart from rolling down the incline, there was an opposing force which might have had an effect on the final velocity. This variation in final velocity could cause our acceleration to be different in the equation $v^2 = v_0^2 + 2a\Delta x$.

In addition to that, the cart would attempt to get off the track throughout its path which decreased the final velocity by increasing friction. This in turn would decrease the acceleration.