

Lab 2A Pre-lab

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Acceleration

Suppose you use a numpy polyfit function to fit the position vs time of an object.

```
results = np.polyfit(time, position, 2)
```

Given the following properties of the motion, what are the elements of the “results” array?

- Initial position = 1 meter
- Initial velocity = 0.5 m/s
- Acceleration = 9.8 m/s

```
results = [ 4.9, 0.5, 1 ]
```

Inclined plane: use the Google Docs, LaTeX, or other equation editor to answer the following questions. See [this tutorial](#) on how to use the Google Docs equation editor. Assume the existence of friction with coefficient of friction μ). Consult the [physics page](#) of the class website for reference.

What is the net force that accelerates an object on an inclined plane due to the effect of gravity, normal force and friction of the inclined plane on the object?

$$\Sigma F_x = F_{gx} - F_f = mg \sin(\theta) - \mu_k F_N = mg \sin(\theta) - \mu_k mg \cos(\theta)$$

What is the equation for velocity at any time for this object on the inclined plane?

$$v = v_i + (\sin(\theta) - \mu_k \cos(\theta)) * t * g$$

What is the equation for position at any time for this object on the inclined plane?

$$x = v_i t + x_i + \frac{1}{2} g t^2 (\sin(\theta) - \mu_k \cos(\theta))$$