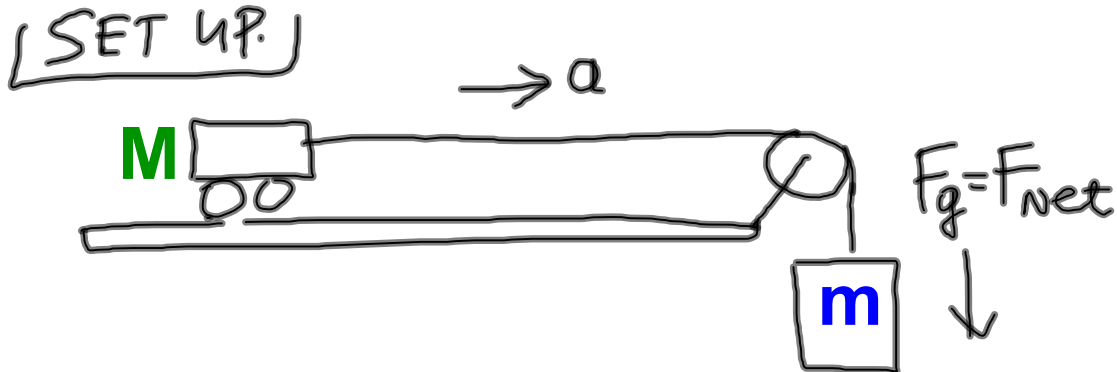


1. Does the acceleration of the cart depend on the net force exerted on the cart?
2. Does the acceleration of the cart depend on its mass?



M = mass of the cart (object of interest)
 m = mass of the cylinder, which provides the net force pulling the cart via string.

Nov 11-9:36 AM

Part 1.

Find out the relationship between the acceleration of the cart and the net force acting on the cart (a vs. F_{net}).

- Keep the mass of the cart (M) constant and vary the net force causing the acceleration by varying the hanging mass (m).

$$F_g = F_{net} = mg$$

Nov 11-9:40 AM

Period 7 data.

Trial Number	Hanging mass m [g]	Hanging mass m [kg]	$F_{\text{net}} = F_g$ [N]	Acceleration a [m/s ²]
1	10			0.1754
2	20			0.3631
3	30			0.53527
4	40			0.71164
5	50			0.87674
6	60			1.0170
7	70			1.12010
8	80			1.30840

Mass of the cart $m = 500$ g. It stays constant!

Nov 11-10:05 AM

Period 3 data.

Trial Number	Hanging mass m [g]	Hanging mass m [kg]	$F_{\text{net}} = F_g$ [N]	Acceleration a [m/s ²]
1	10			0.15486
2	20			0.33472
3	30			0.52280
4	40			0.68942
5	50			0.87656
6	60			1.02610
7	70			1.19080
8	80			1.34000

Mass of the cart $m = 500$ g. It stays constant!

Nov 11-10:05 AM

Part 2.

Find out the relationship between the acceleration of the cart and its mass (a vs. m).

- Keep the hanging mass constant (50g) and vary mass of the cart.

Nov 11-9:40 AM

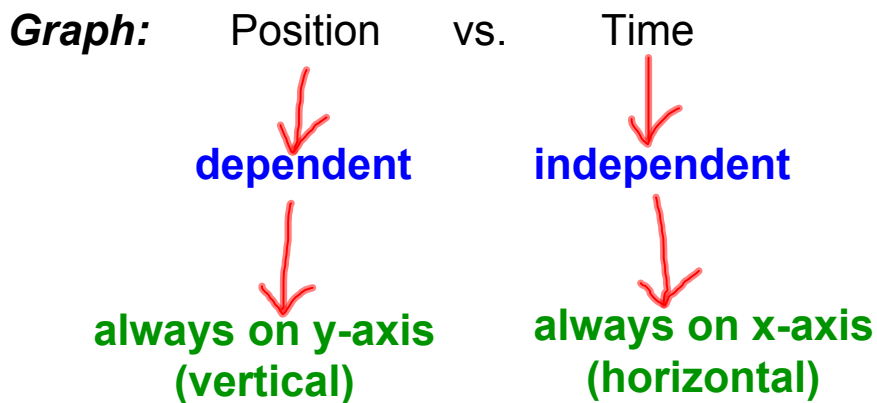
TRIAL	MASS OF THE CART	ACCELERATION m/s^2	HANGING MASS: $m = 50g$ <u>CONSTANT!!!</u>
1	500g	0.90640	Period 3 data
2	1,000g	0.46809	
3	1,500g	0.31786	
4	1,600g	0.30375	
5	1,700g	0.28147	
6	1,800g	0.25478	
7	1,900g	0.24485	
8	2,000g	0.22280	

Nov 12-9:34 AM

TRIAL	MASS OF THE CART	ACCELERATION m/s^2	HANGING MASS: $m = 50g$ <u>CONSTANT!!!</u>
1	500 g	0.86725	Period 7 data
2	1,000 g	0.30367	
3	1,500 g	0.46937	
4	1,600 g	0.29224	
5	1,700 g	0.27739	
6	1,800 g	0.25900	
7	1,900 g	0.24549	
8	2,000 g	0.23660	

Nov 12-9:34 AM

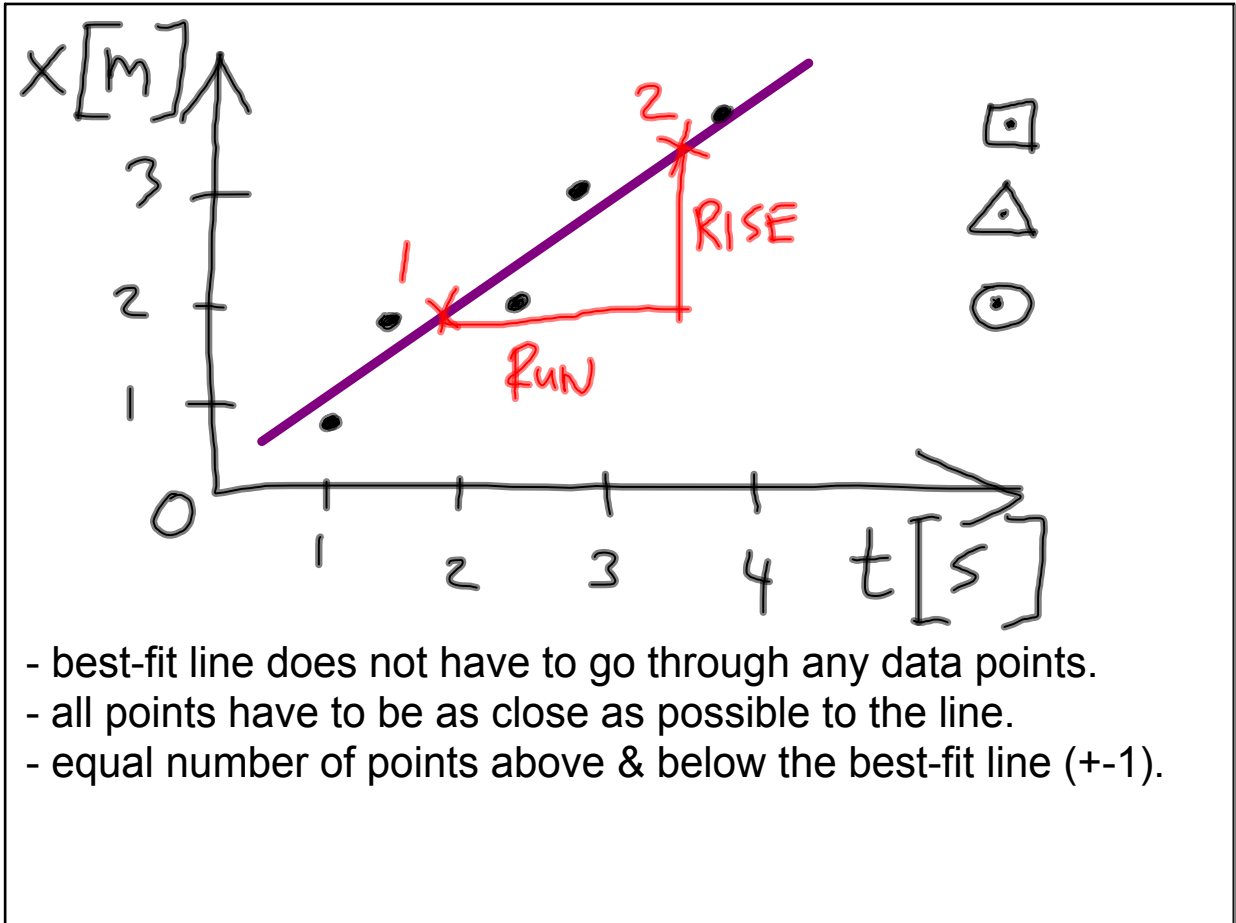
Graphing principles.



- Use min. of 75% of the available area for the graph.

- **Determine if it is proper to include data point (0,0).**

Nov 12-9:54 AM



Nov 12-9:57 AM

- Calculate the slope of the best fit line by picking 2 points on the best-fit line.

$$\text{SLOPE} = \frac{\text{RISE}}{\text{RUN}}$$

$$S = \frac{x_2 - x_1}{t_2 - t_1}$$

- Do dimensional analysis of the slope to find out if the slope has a physical meaning.

$$S = \left[\frac{\text{m}}{\text{s}} \right]$$

Slope of v-t graph represents **velocity**

Nov 12-1:44 PM