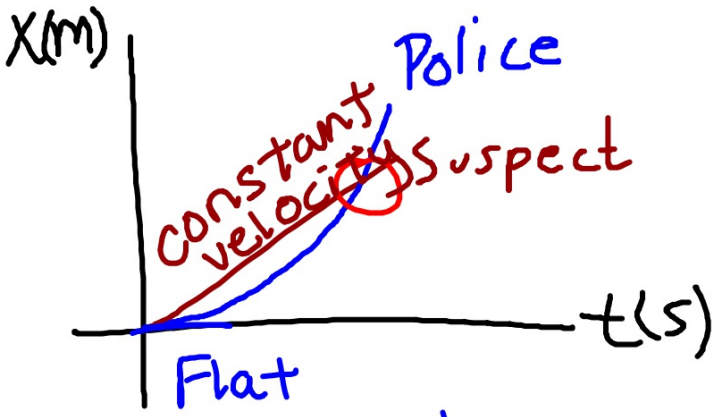
Bellwork



Flat slope at beginning (starts at rest)

Describe the motion of the two cars. What does the intersection represent?

Algebra Drill (solve for y)

$y = 2x$ $\quad$ $y = 3x^2$

$$2x = 3x^2$$

$$\frac{2x}{x} = \frac{3x \cdot x}{x}$$

$$2 = 3x$$

$$\frac{2}{3} = x$$

plug in to either of originals

$$y = 2\left(\frac{2}{3}\right) = \frac{4}{3}$$

$a = 0$

Constant velocity suspect.

What is $\Delta \vec{x}$

$$\Delta \vec{x} = \vec{v}_i \Delta t + \frac{1}{2} \vec{a} \Delta t^2$$

($\vec{a} \to 0$)

$$\boxed{\Delta \vec{x} = \vec{v}_i \Delta t}$$

Accelerating Police. What is $\Delta \vec{x}$?

$$\Delta \vec{x} = \vec{v}_i \Delta t + \frac{1}{2} \vec{a} (\Delta t)^2$$

($\vec{v}_i \to 0$)

$$\boxed{\Delta \vec{x} = \frac{1}{2} \vec{a} (\Delta t)^2}$$

$\Delta \vec{x} = ?$

$\Delta t = ?$

Fan Car

$\Delta\vec{x} = ?$

$\Delta t = ?$

$\vec{a}$ = Measure

$\vec{V}_i = 0 \frac{m}{s}$

same

same

Buggy

$\Delta\vec{x} = ?$

$\Delta t = ?$

same $\vec{V}_i$ = Measure

$\vec{V}_f$ = Measure

$\Delta x = V_i \Delta t + \frac{1}{2} a (\Delta t)^2$ ($V_i = 0$)

$\Delta x = \frac{1}{2} a (\Delta t)^2$

$\Delta\vec{x} = V_i \Delta t + \frac{1}{2} a (\Delta t)^2$ ($V_i = 0$)

$\Delta\vec{x} = V_i \Delta t$

plug in for Δx

$$\frac{\frac{1}{2}\vec{a}(\Delta t)^2}{\Delta t} = \frac{\vec{V}_i \Delta t}{\Delta t}$$

$$\frac{1}{2}\vec{a}\,\Delta t = \vec{V}_i$$

$$\Delta t = \frac{2\vec{V}_i}{a}$$

Now plug into either of the original equations.

$$\Delta\vec{x} = \vec{V}_i \cdot \left(\frac{2\vec{V}_i}{\vec{a}}\right)$$

$\Delta\vec{x}$ = displacement for both vehicles.