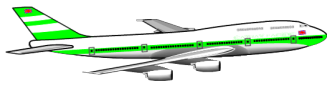


Calculating Acceleration from Displacement & Velocity

An airplane must reach a velocity of 71 m/s (V_2) for takeoff. If the runway is 1.0 km long, what must the constant acceleration be? (Δd)

$V_1 = 0$

$V_2 = 71 \frac{m}{s}$

$\Delta d = 1.0 km$

$a = ??$

$$V_2^2 = V_1^2 + 2a\Delta d$$

$$\frac{V_2^2 - V_1^2}{2\Delta d} = \frac{2a\Delta d}{2\Delta d}$$

$$a = \frac{V_2^2 - V_1^2}{2\Delta d}$$

$$a = \frac{(71 m/s)^2 - 0^2}{2(1.0 \times 10^3 m)}$$

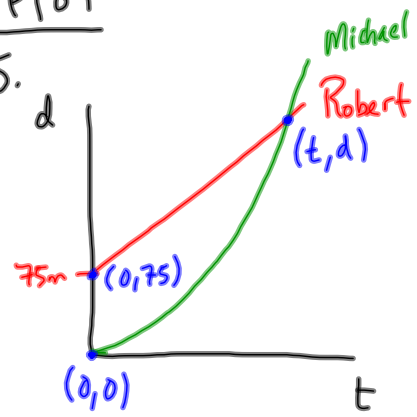
$$a = \frac{(71 m/s)^2}{2(1.0 \times 10^3 m)}$$

$$\frac{m^2/s^2}{m} \quad m/s^2$$

$$a = 2.5 \frac{m}{s^2}$$

PP|89

5.



Robert - constant velocity

$V = 4.2\ m/s$

$\Delta d = ?$

$\Delta t = ?$

$V = \frac{\Delta d}{\Delta t}$

$\Delta d = V\Delta t$

$d - 75 = \left(4.2\frac{m}{s}\right)(t - 0)$

$d = \left(4.2\frac{m}{s}\right)t + 75$

$(y = mx + b)$

Michael - constant acc.

$V_1 = 3.8\ m/s$

$a = 0.15\frac{m}{s^2}$

$\Delta d = ?$

$\Delta t = ?$

$t - 0 = t$

$\Delta d = V_1\Delta t + \frac{1}{2}a(\Delta t)^2$

$d - 0 = \left(3.8\frac{m}{s}\right)t + \frac{1}{2}\left(0.15\frac{m}{s^2}\right)t^2$

$d = \left(3.8\frac{m}{s}\right)t + \left(0.075\frac{m}{s^2}\right)t^2$

$4.2t + 75 = 3.8t + 0.075t^2$

$0 = 0.075t^2 - 0.4t - 75$

TO DO

① Find your Reaction time by dropping a ruler:

Δd = measure

$a = -9.81\ m/s^2$

$V_1 = 0\ \frac{m}{s}$

$\Delta t = ?$

② Popper Physics (1 - 4)

HW: Be sure the PP|89 are done
+ Calculator Pad (1-15)