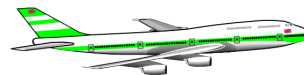


Using the kinematics equations:



### Calculating Acceleration from Displacement and Velocity

An airplane must reach a velocity of  $71 \text{ m/s}$  for takeoff. If the runway is  $1.0 \text{ km}$  long, what must the constant acceleration be?

$$V_1 = 0$$

$$V_2 = 71 \text{ m/s}$$

$$\Delta d = 1.0 \text{ km} = 1.0 \times 10^3 \text{ m}$$

$$a = ?$$

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

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

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

$$a = \frac{(71 \text{ m/s})^2}{(2(1000 \text{ m}))}$$

$$a = 2.5 \text{ m/s}^2$$

TO DO:

1. Use a ruler to find your reaction time by dropping & catching it.
2. Popper Physics (1-4)
3. Calculator Pad (ALL)

$$\begin{aligned}
 & \downarrow \\
 & V_1 = 0 \\
 & \Delta d = \text{measure (-)} \\
 & a = -9.81 \text{ m/s}^2 \\
 & \Delta t = ??
 \end{aligned}$$