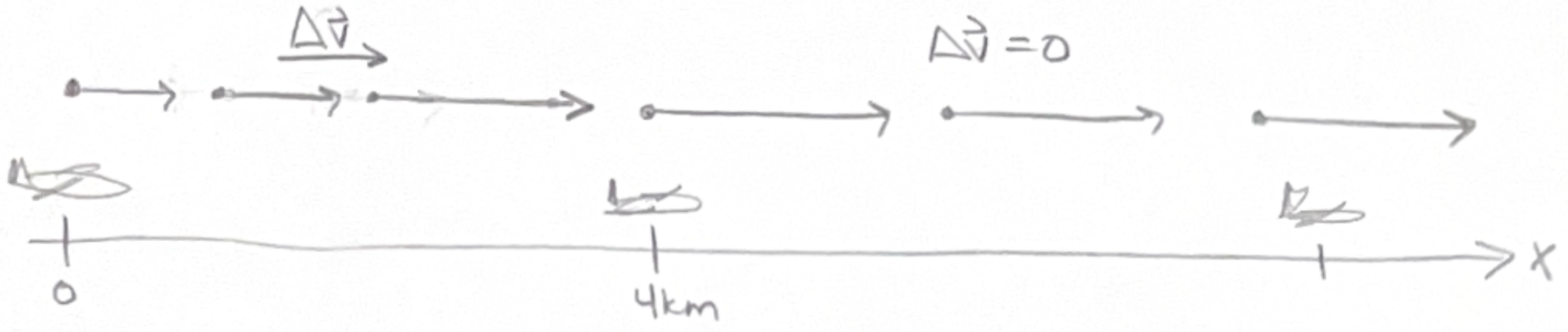
Activity 2



$t_0 = 0$
$x_0 = 0$
$v_{0x} = 300\ m/s$

$t_1 =$
$x_1 = 4\ km$
$v_{1x} = 400\ m/s$

$t_2 =$ one hour after t_1
$x_2 = ?$
$v_{2x} = 400\ m/s$

$\vec{a}$

$a_{0x} = ?$

constant acceleration

$a_{1x} = 0$

constant velocity

Δx ✓
v_x ✓
Δt ✓

object model: point particle

Find a_{0x} using segment 1

Δx ✓
v_{ix} ✓
v_{fx} ✓
a_x =
Δt

① $v_{fx}^2 = v_{ix}^2 + 2a_x\Delta x$

② $v_{1x}^2 = v_{0x}^2 + 2a_{0x}\Delta x$

$$\frac{v_{1x}^2 - v_{0x}^2}{2\Delta x} = \frac{2a_{0x}\Delta x}{2\Delta x}$$

③ $$\frac{v_{1x}^2 - v_{0x}^2}{2\Delta x} = a_{0x}$$

$$\frac{(400\ m/s)^2 - (300\ m/s)^2}{2(4000\ m)} = a_{0x}$$

$$\frac{160000\ \frac{m^2}{s^2} - 90000\ \frac{m^2}{s^2}}{8000\ m} = a_{0x}$$

$$\boxed{8.8\ m/s^2 = a_{0x}}$$

The acceleration is
$(8.8\ m/s^2, +x\text{-dir.})$

It's a vector, so it should be written as a vector

Find x_2 using segment 2

① $x_f = x_i + v_x\Delta t$

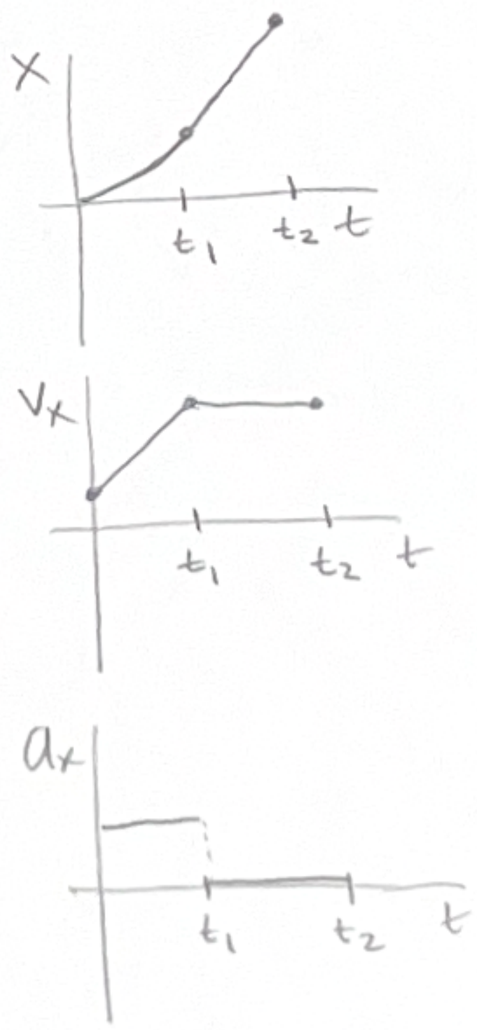
②③ $x_2 = x_1 + v_{1x}\Delta t$

$x_2 = 4\ km + .4\ \frac{km}{s}\left(1\ h \times \frac{3600\ s}{1\ h}\right)$

$x_2 = 4\ km + 1440\ km$

$\boxed{x_2 = 1444\ km}$

The total distance traveled is 1444 km



Evaluate for Reasonableness

- The acceleration is positive, which it should be, and it has the correct units.
- The distance seems to be on the scale of what a jet plane might travel in that situation