# P2o Unit A VA pt A. KEY!

1.) $\vec{d} = 1.0m + 1.0m + 2.0m + -2.0m = 0m$

$d = 1.0m + 1.0m + 2.0m + 2.0m = 6.0m$

2) $\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$ $\quad 3.00 \times 10^8 m/s = \frac{\Delta \vec{d}}{498s}$ $\quad \Delta \vec{d} = 1.5 \times 10^{11} m$

$8.3 min \times \frac{60s}{min} = 498s$

3.) a) $\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$ $\quad \frac{3.5km}{s} \times \frac{1000m}{1km} = 3500m/s$

$(3500\frac{m}{s})^2 = (0m/s)^2 + 2\vec{a}(0.02m)$

$\vec{a} = 3.1 \times 10^8 m/s^2$

b.) $\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$ $\quad 3.1 \times 10^8 m/s^2 = \frac{3500\frac{m}{s} - 0m/s}{t}$

$t = 1.1 \times 10^{-5} s$

4.) $\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$

$(600m/s)^2 = (0m/s)^2 + 2(\vec{a})(0.90m)$

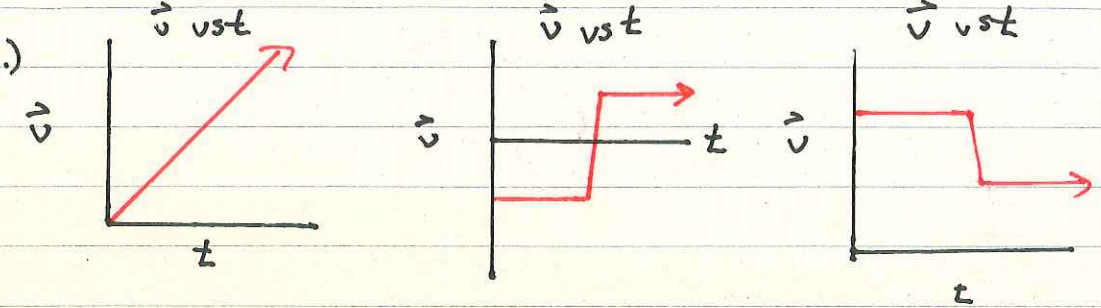
$\vec{a} = 2.0 \times 10^5 m/s^2$

5.) a) slope $= \frac{rise}{run} = \frac{30m/s}{5s} = 6m/s^2$

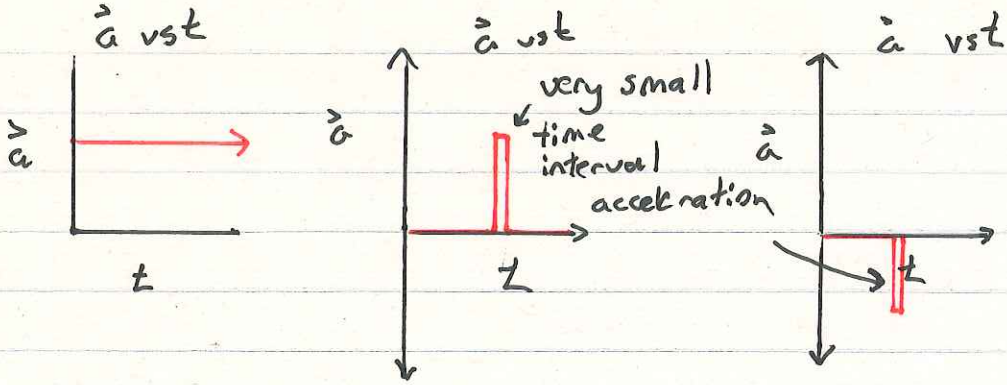
b.) $\frac{rise}{run} = \frac{0m/s}{1s} = 0m/s^2$

c.) $\frac{rise}{run} = \frac{-30m/s}{5s} = -2m/s^2$

6.) a.)



6 b.)




7.) $m = \frac{20m - 3m}{3.75s - 1.5s} = 7.6 m/s$ * Note: answers will vary depending on the points you choose to find slope.

8.) a) $m = \frac{rise}{run} = \frac{(20 m/s - 12.5 m/s)}{(10s - 0s)} = 0.75 m/s^2$

b.) $\vec{d} = \frac{(\vec{v}_f + \vec{v}_i)}{2} t$ $\quad d = \frac{(37.5 m/s + 22.5 m/s)(20s)}{2}$

$d = 6.0 \times 10^2 m$

c.) $\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$ $\quad 0.75 m/s^2 = \frac{\vec{v}_f - 12.5 m/s}{(75s)}$

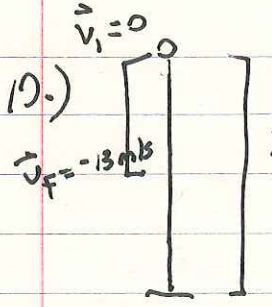
$\vec{v}_f = 69 m/s$ *Note: answers will vary depending on slope from pt. a).

9.) $\vec{d} = \vec{v}_i t + \frac{1}{2} \vec{a} t^2$

$-35 m = \frac{1}{2}(-9.81 m/s^2) t^2$

$t = 2.7s$

10.)




Where $\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$

$(-13 m/s)^2 = 2(-9.81 m/s^2)\vec{d}$

$\vec{d} = -8.6137 m$ ↑ drop from starting position.

$\Delta\vec{d} = -24m - -8.6137m$

$= -15m$

or 15m above the ground.

11.) a) $\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$

$\vec{d} = \frac{1}{2}(-9.81 m/s^2)(6.00 s)^2$

$\vec{d} = 177m$

b.) $\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$

$\vec{v}_f^2 = 2(-9.81 m/s^2)(-177m)$

$\vec{v}_f = -58.9 m/s$

↑ note: write the negative root of the answer since the object is moving downwards.