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$$a = 9.8 \text{ m/s}^2$$

Starts from rest $v_0 = 0$

$$V = .1c$$

$$= .1(3.0 \times 10^8 \text{ m/s})$$

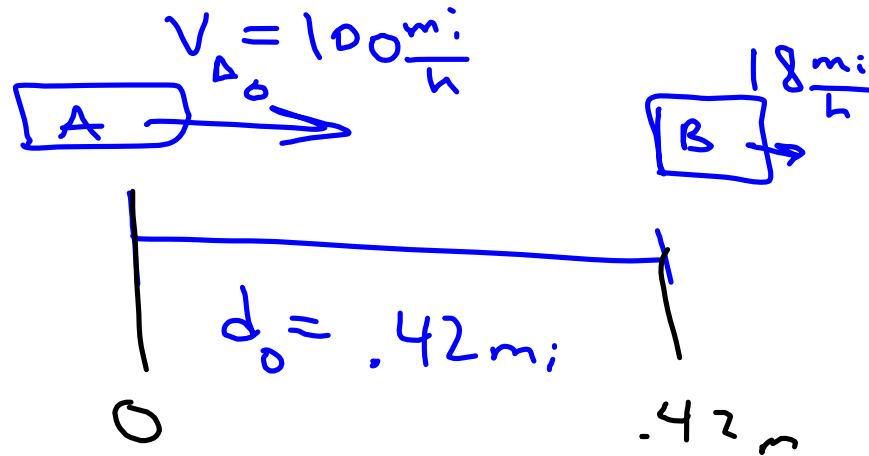
ND: t, d

$$V = V_0 + at$$

$$\frac{3.0 \times 10^7 \text{ m/s}}{9.8 \text{ m/s}^2} = t$$

$$d = \cancel{d_0} + \cancel{v_0 t} + \frac{1}{2} a t^2$$

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$$d_A = d_{A0} + 100 \frac{m}{s} (t) + \frac{1}{2} a t^2$$

$$d_B = .42 m + \left(18 \frac{m}{s} \right) t$$

$$.42 m + \left(18 \frac{m}{s} \right) t = \left(100 \frac{m}{s} \right) t + \frac{1}{2} a t^2$$

$$v_B = 18 \frac{m}{s}$$

$$v_A = 100 \frac{m}{s} + a t$$

$$18 = 100 + a t$$

$$\frac{-82}{a} = t$$

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$$d_y = .544 \text{ m}$$

FIND: v_{y_0} $t = .2 \text{ sec}$

$$d_y = d_{y_0} + v_{y_0} t + \frac{1}{2} a_y t^2$$

$$.544 \text{ m} = 0 + v_{y_0} (.2 \text{ s}) + \frac{1}{2} (-9.8 \frac{\text{m}}{\text{s}^2}) (.2 \text{ s})^2$$

$$v_0 = 3.7 \frac{\text{m}}{\text{s}}$$

b)

$$V = v_0 + at$$

$$V = 3.7 \frac{\text{m}}{\text{s}} + (-9.8 \frac{\text{m}}{\text{s}^2}) (.2 \text{ s}) = 1.74 \frac{\text{m}}{\text{s}}$$

c) 1st off find t when $v=0$

$$0 = 3.7 \frac{\text{m}}{\text{s}} + (-9.8 \frac{\text{m}}{\text{s}^2}) (t)$$

$$t = \frac{3.7}{9.8} = 0.3775 \text{ sec}$$

$$d_{y_{\text{max}}} = 0 + (3.7 \frac{\text{m}}{\text{s}}) (.3775 \text{ s}) + \frac{1}{2} (-9.8) (.3775)^2$$
$$d_{y_{\text{max}}} = .6985 \text{ m}$$