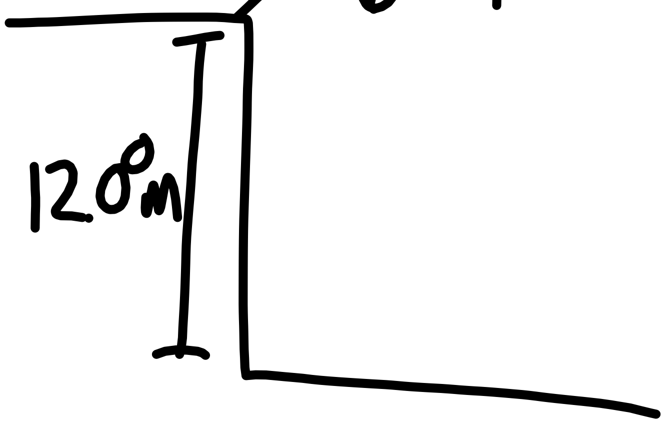
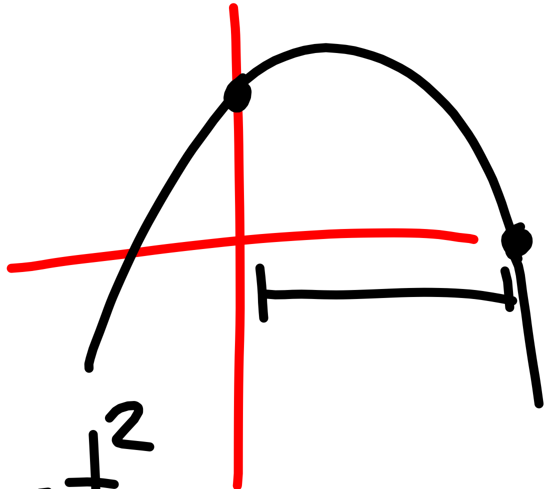
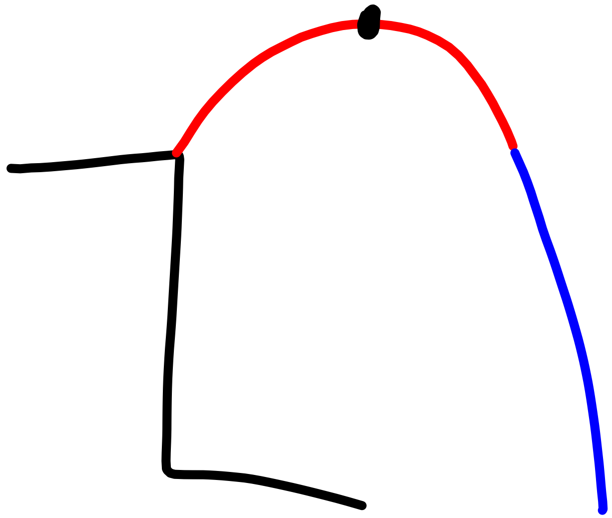
$\theta = 45°$ $\quad V_i = 14.0 \frac{m}{s}$





$$x(t) = x_0 + v_{ix} t + \frac{1}{2} a t^2$$



$$\cancel{v_f}^{\,0} = v_i + at$$

$$\frac{-v_{iy}}{-g} = t$$

From Yesterday....

$\underline{X}$

$d_x = v_{i_x} t + \cancel{\frac{1}{2} a t^2}^{\,0}$

$d_x = v_i t$

$\frac{d_x}{v_{ix}} = t$

$\underline{Y}$

$\cancel{v_{fy}}^{\,0} = v_{iy} + a_y t$

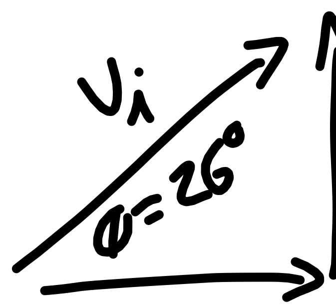
$\frac{-2v_{iy}}{-g} = t$

$\frac{d_x}{v_{ix}} = \frac{v_{iy}}{g}$

$d_x g = v_{iy} v_{ix}$

$$d_x g = 2 v_{iy} v_{ix}$$

$$d_x g = 2 v_i \sin\theta \, v_i \cos\theta$$



$$v_{iy} = v_i \sin\theta$$

$$v_{ix} = v_i \cos\theta$$

$$\frac{v_{ix}}{\cos\theta} = \frac{v_{iy}}{\sin\theta} \quad \leftarrow \quad \frac{v_{ix}}{\cos\theta} = v_i \qquad \frac{v_{iy}}{\sin\theta} = v_i$$

$$v_{iy}\cos\theta = v_{ix}\sin\theta$$

$$v_{iy} = \frac{v_{ix}\sin\theta}{\cos\theta} = v_{ix}\tan\theta$$

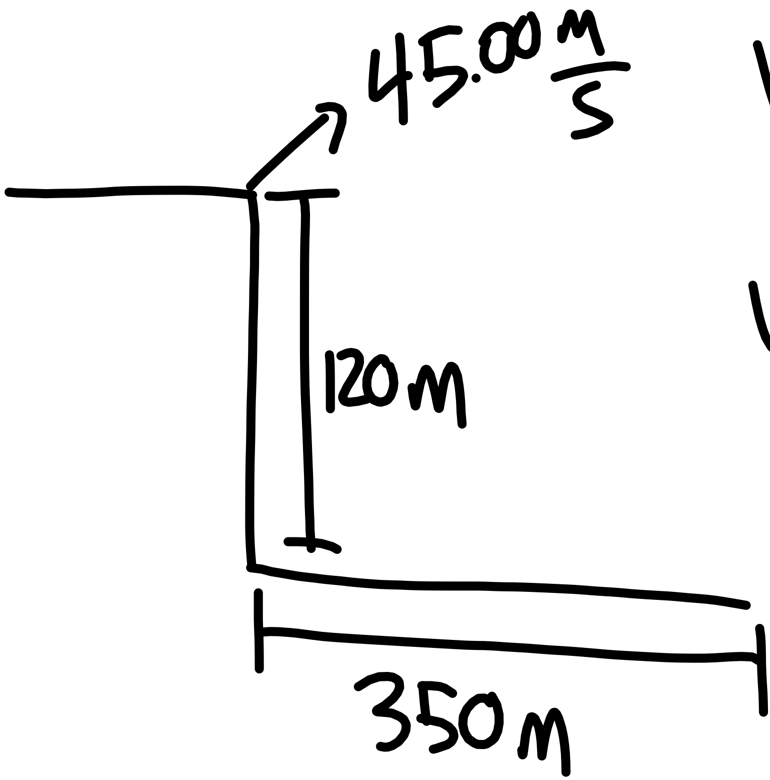
$$d_x g = 2 V_{iy} V_{ix}$$

$$d_x g = 2 V_{ix} \tan\phi \, V_{ix}$$

$$d_x g = 2 V_{ix}^2 \tan\phi$$

$$\sqrt{\frac{d_x g}{2\tan\phi}} = V_{ix} = 220.5 \frac{m}{s}$$

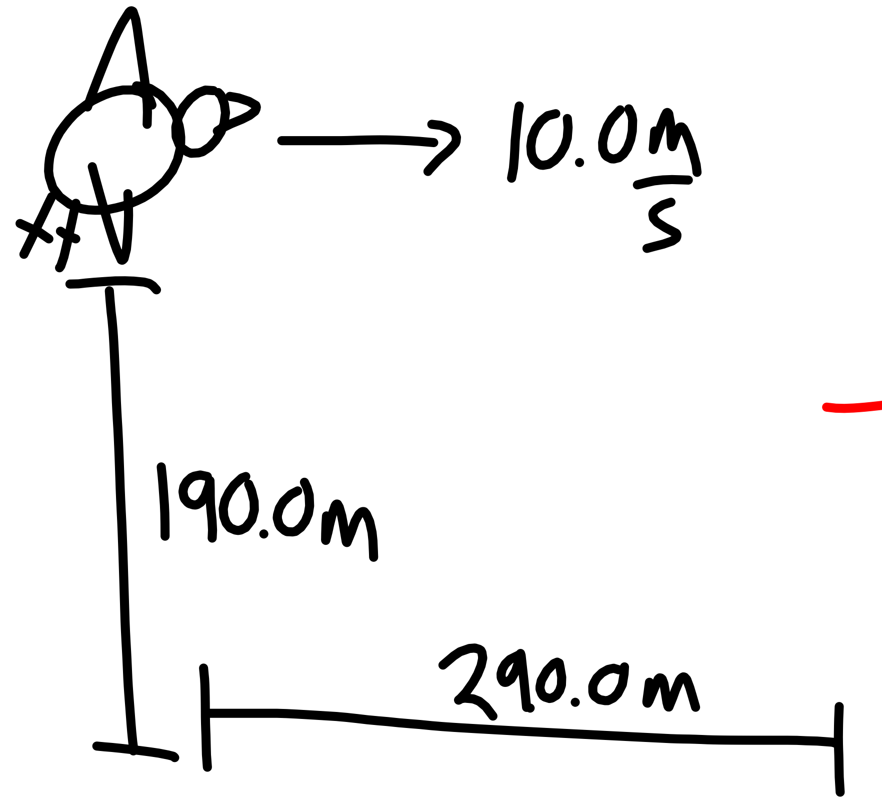
e)

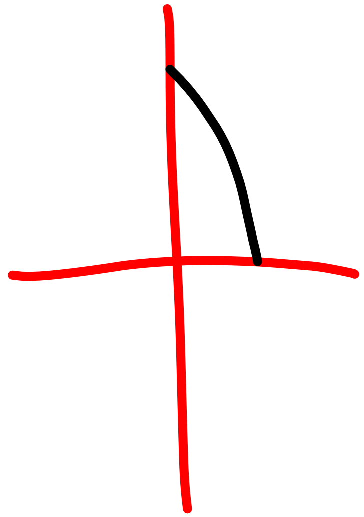


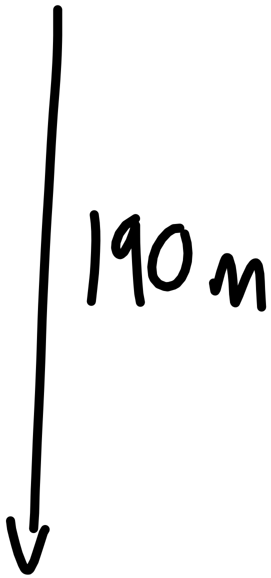
$$V_{iy} = V_i \sin\theta$$

$$V_{iy} = 31.82 \frac{m}{s}$$

f)







$$d = \cancel{v_1 t} + \frac{1}{2}at^2$$

$$-190 = \frac{1}{2}at^2$$

$$0 = 190 + 4.905t^2$$