P #22

Ch. 3 - pg 75

$V_x = 100.8$ mi/hr
$d = 60.0 \text{ ft} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} = .011$ mi

$d_x = V_x \cdot t$ so $.011 \text{ mi} = (100.8 \text{ mi/hr}) \cdot t$ $t = (1.13 \times 10^{-4} \text{ hr}) \cdot \left(\frac{3600 \text{ sec}}{1 \text{ hr}}\right)$

$t = .406$ sec

$a = -9.8 \text{ m/s}^2$
$t = .406$ sec

$d_y = \frac{1}{2} \cdot a \cdot t^2$
$= \frac{1}{2}(9.8 \text{ m/s}^2)(.406 \text{ sec})^2$

$\boxed{d_y = .807 \text{ m}}$

P #24

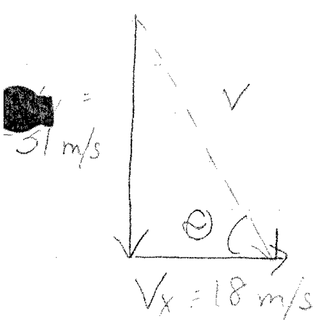
$d_y = 50.0\ m$
$v_{oy} = 0\ m/s$
$v_{ox} = 18.0\ m/s$

$d_y = \frac{1}{2} \cdot a \cdot t^2$ so $(50.0\ m) = \frac{1}{2} \cdot (9.8\ m/s^2) \cdot t^2$

$$\boxed{t = 3.19\ sec}$$

V_x remains constant so $V_x = 18.0\ m/s$

$V_y = V_{oy} + a \cdot t$
$= 0\ m/s + (-9.8\ m/s^2)(3.19\ s)$
$V_y = -31.3\ m/s$



$V = \sqrt{V_x^2 + V_y^2}$
$= \sqrt{(18\ m/s)^2 + (31.3\ m/s)^2}$

$$\boxed{V = 36.1\ m/s}$$

$\Theta = \tan^{-1}\left(\frac{31.3}{18}\right)$

$\boxed{\Theta = 60.1^\circ \text{ from the horizontal}}$