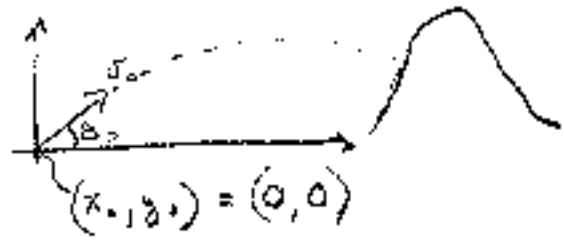
CHAPTER 3/4

10. GIVEN: $v_0 = 300\ m/s$

$\theta_0 = 55.0°$

$t = 42.0\ s$

FIND: $x(t)$, $y(t)$



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

$v_{x_0} = v_0 \cos\theta_0$

$= 300\ m/s \cos 55$

$= 172.1\ m/s$

$x(42s) = (172.1\ m/s)(42.0s)$

$= \boxed{7230\ m}$

$y(t) = \cancel{y_0} + v_{y_0} t + \frac{1}{2} a_y t^2$

$v_{y_0} = v_0 \sin\theta_0$

$= 300\ m/s \sin 55°$

$= 245.8\ m/s$

$y(42s) = 245.8\ m/s(42.0s) - \frac{1}{2}(9.8\ m/s^2)(42s)^2$

$= \boxed{1690\ m}$

31. GIVEN: $r_1 = 0.600\ m$ $\quad r_2 = 0.900\ m$

$f_1 = 8\ rev/s$ $\quad f_2 = 6\ rev/s$

FIND: v_1, v_2 WHICH IS GREATER? a_1, a_2

$v = \frac{2\pi r}{T} = 2\pi r f$

$v_1 = 2\pi(.6m)(8\ \frac{rev}{s}) = \boxed{30.2\ \frac{m}{s}}$

$v_2 = 2\pi(.9m)(6\ \frac{rev}{s}) = \boxed{33.9\ \frac{m}{s}}$

$a = \frac{v^2}{r}$

$a_1 = \frac{(30.2\ m/s)^2}{.6m} = \boxed{1520\ m/s^2}$

$a_2 = \frac{(33.9\ m/s)^2}{.9} = \boxed{1280\ m/s^2}$