CHAPTER 2

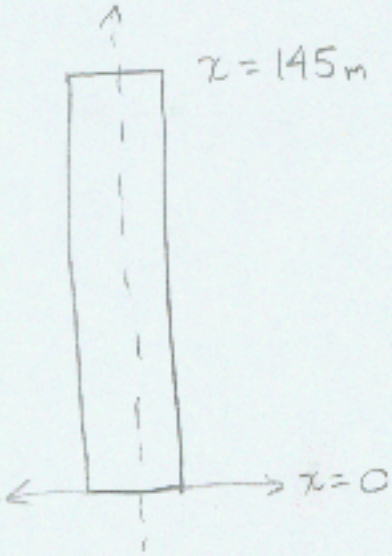
68. GIVEN: 145 m TOWER

FIND: a. t FOR FREE FALL

b. $x(5.18\,s)$

c. $v(5.18\,s)$

d. a FOR $v(5.18\,s) \rightarrow 0$ IN REMAINING DISTANCE



a. $x = x_0 + \cancel{v_0 t}^{\,0} + \frac{1}{2}at^2$

$0\,m = 145\,m + \frac{1}{2}(-9.8\,m/s^2)\,t^2$

$t^2 = \frac{(145\,m)(2)}{9.8\,m/s^2} = 29.6\,s^2$

$\boxed{t = 5.44\,s}$

b. $x(t) = x_0 + \cancel{v_0 t}^{\,0} + \frac{1}{2}at^2$

$x(5.16\,s) = 145\,m + \frac{1}{2}(-9.8\,m/s^2)(5.16\,s)^2 = \boxed{13.5\,m}$

$\Delta x = 13.5\,m - 145\,m = \boxed{-131.5\,m}$ ≈ -132 m

c. $v(t) = \cancel{v_0}^{\,0} + at$

$v(5.16\,s) = (-9.8\,m/s^2)(5.16\,s) = \boxed{-50.8\,m/s}$ DOWN

d. $v^2 = v_0^2 + 2a(x - x_0)$

$0 = (50.8\,m/s)^2 + 2(a)(0 - 13.5\,m)$

$a = \frac{(50.8\,m/s)^2}{2(13.5\,m)} = \boxed{95.4\,m/s^2}$ UP