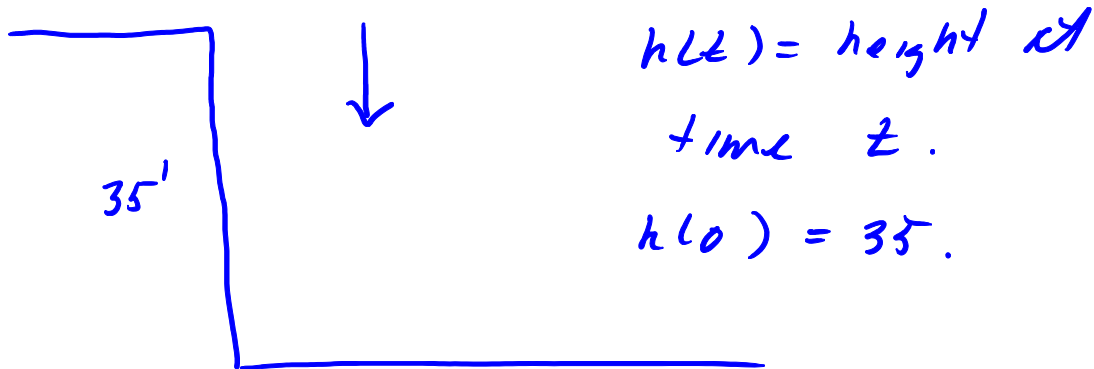Suppose you drop a pen from the third floor of the math and stat building. If the pen is 35 feet above ground level, at what velocity does the pen hit the ground?

$h(t) = $ height at time t.

$h(0) = 35$.

$h'(t) = $ velocity at time t. $h'(0) = 0$

$h''(t) = -32 \; ft/s^2$, $h'(t) = -32t + c$

Since $h'(0) = 0$, $h'(t) = -32t$.

$h(t) = -16t^2 + k$, $h(0) = 35$ so

$h(t) = -16t^2 + 35$.

$-16t^2 + 35 = 0$, $t^2 = \dfrac{35}{16}$, $t = 1.48 \; sec$

$v(1.48) = -32(1.48) = 47.4 \; ft/sec$