A ball is thrown off a 60 ft roof with a velocity of 30 ft/s. Find the height of ball at any time t.

gravity = -32 ft/s^2 $= -9.8$ m/s^2

$a(t) = -32$

$v(t) = \int -32\,dt = -32t + c$

$30 = -32(0) + c$

$c = 30$

$v(t) = -32t + 30$

$h(0) = 60$ ft

$v(0) = 30$ ft/s

$h(t) = \int -32t + 30\,dt = -16t^2 + 30t + c_1$

$60 = c_1$

$\boxed{h(t) = -16t^2 + 30t + 60}$

Max height? $v(t) = 0$ & Plug into $h(t)$

When hits ground? $h(t) = 0$ + solve t

$v(t)$ when hits? ↙ Plug into $v(t)$