

Ex 3) A ball is thrown upward from a height of 10 ft w/ initial velocity 80 ft/sec.

How high will the ball go?

Find  $v(t)$  and  $x(t)$

(Use  $a(t) = -32 \text{ ft/sec}^2$  due to gravity)

$$a(t) = -32$$

$$v(t) = \int -32 dt = -32t + C$$
$$-32(0) + C = 80$$
$$C = 80$$

$$v(t) = -32t + 80$$

$$x(t) = \int (-32t + 80) dt$$

$$x(t) = -16t^2 + 80t + C$$

$$10 = -16(0)^2 + 80(0) + C$$
$$C = 10$$

$$x(t) = -16t^2 + 80t + 10$$

$$v(t) = -32t + 80 = 0 \quad \text{OR} \quad \frac{-80}{2(-16)} = \frac{80}{32}$$
$$t = \frac{80}{32} \text{ sec}$$