

3.1 **Ex 5** Projectile Motion

Ball projected upward:

initial height (s_0) = 100 ft

initial velocity (v_0) = 80 ft/s

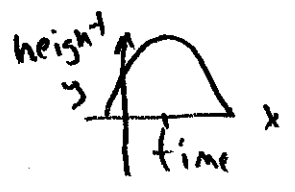
$s(t) = -16t^2 + v_0t + s_0$

a) Give function that describes height of ball in terms of time t .

$s(t) = -16t^2 + 80t + 100$

b) After how many seconds does the ball reach its maximum height? What is the height?

vertex: $x = \frac{-b}{2a} = \frac{-80}{2(-16)} = 2.5$



Ball reaches max height in **2.5 seconds**

$s(2.5) = -16(2.5)^2 + 80(2.5) + 100$
 $= \mathbf{200 \text{ feet}}$ Max height of ball

d) After how many seconds will ball hit ground?

$0 = -\frac{16t^2}{4} + \frac{80t}{4} + \frac{100}{4}$

$0 = -4t^2 + 20t + 25$

Ex 5 d) Cont

Day 2

(2)

$$0 = -4t^2 + 20t + 25$$

$$t = \frac{-20 \pm \sqrt{400 - 4(-4)(25)}}{2(-4)}$$

$$t = \frac{-20 \pm \sqrt{800}}{-8} \leftarrow \text{Hit Enter NOW}$$

$$t = -1.036 \quad t = 6.035 \approx 6.04 \text{ sec}$$