MATH 141 (Section 5 & 6)
Prof. Meade

University of South Carolina
Fall 2013

Quiz 3
September 12, 2013

Name: _____Key_____
Section: 005 / 006 (circle one)

1. (10 points) If a ball is thrown into the air with an initial velocity of 40 ft/s, its height in feet t seconds later is given by $y = 40t - 16t^2$.

(a) Find the average velocity over the interval $[3, 4]$.

$$V_{avg} = \frac{v(4) - v(3)}{4-3} = \frac{(40 \cdot 4 - 16 \cdot 4^2) - (40 \cdot 3 - 16 \cdot 3^2)}{4-3}$$

$$= \frac{-96 - (-24)}{1}$$

$$= -72 \text{ ft/sec.}$$

(b) Write the intantaneous velocity when $t = 3$ as a limit.

$$V_{inst.} = \lim_{t \to 3} \frac{v(t) - v(3)}{t-3} = \lim_{t \to 3} \frac{40t - 16t^2 + 24}{t-3}$$

(c) Evaluate the limit in (b).

$$V_{inst} = \lim_{t \to 3} \frac{-16t^2 + 40t + 24}{t-3}$$

$$= \lim_{t \to 3} \frac{(t-3)(-16t - 8)}{t-3}$$

$$= \lim_{t \to 3} -16t - 8$$

$$= -48 - 8 = -56 \text{ ft/sec.}$$