Math 171 - Quiz 6

October 4, 2012

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) An object is launched upward with an initial speed of 48 ft/s over the side of a 160-ft cliff.

   (a) Find the formula for the object's height at time t. Use $g = 32\,\text{ft/s}^2$.

   $s(t) = -16t^2 + 48t + 160$

   (b) Find the velocity function.

   $v(t) = s'(t) = -32t + 48$

   (c) Find the object's maximum height.

   $v(t) = 0 \Rightarrow -32t + 48 = 0$

   $\Rightarrow t = \frac{48}{32} = \frac{3}{2}$

   $s(1.5) = 196$ FT

   (d) When does the object hit the ground?

   $s(t) = 0 \Rightarrow -16(t^2 - 3t - 10) = -16(t-5)(t+2) = 0$

   $t = 5$ sec

2. (2 points) Let $f(x) = \cos(x^2)$. Find $f''(x)$.

   $f'(x) = -\sin(x^2)(2x)$

   $= -2x\sin(x^2)$

   $f''(x) = -2x\cos(x^2)(2x) - 2\sin(x^2)$

   or $-4x^2\cos(x^2) - 2\sin(x^2)$

3. (3 points) Differentiate.

   (a) $\frac{d}{dx}(x^3 - 3x^2 + 5x - 7)^9$

   $= 9(x^3 - 3x^2 + 5x - 7)^8(3x^2 - 6x + 5)$

   (b) $\frac{d}{dr}\sin\left(\sqrt[5]{r^2} + \tan r\right)$

   $= \cos\left(r^{2/5} + \tan r\right)\left(\frac{2}{5}r^{-\frac{3}{5}} + \sec^2 r\right)$