Math 157 - Quiz 5

October 1, 2014

Name key

Score _____

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

1. (6 points) Determine each derivative.

(a) $\frac{d}{dx}\left(5x^4 - 8x^3 + 4x - 1\right) = 20x^3 - 24x^2 + 4$

(b) $\frac{d}{dr}\left(\frac{7}{\sqrt{r}}\right) = \frac{d}{dr}\, 7r^{-1/2} = -\frac{7}{2} r^{-3/2}$

(c) $\frac{d}{dt}\left(12t + 10e^{0.2t}\right) = 12 + 10e^{0.2t}(0.2)$

$= 12 + 2e^{0.2t}$

2. (3 points) Find an equation of the line tangent to the graph of $f(x) = 6 - 3x + 5x^2$ at the point where $x = 2$.

Slope: $f'(x) = -3 + 10x$ Point: $x = 2$

$m = f'(2) = 17$ $y = f(2) = 20$

$y - 20 = 17(x - 2)$

or

$y = 17x - 14$

3. (1 points) What is the instantaneous rate of change of $s(t) = 5\ln(t) + 6e^t$ at the point where $t = 1$?

$s'(t) = \frac{5}{t} + 6e^t$

$s'(1) = 5 + 6e \approx 21.31$