Math 203 Fall 2018 Professor MG
Classwork 3 Name: _____

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. (*0 points*) Find the derivatives of the following functions

(a) $\sqrt[3]{2x+1}$

(b) $(4x+5)^2$

(c) $24(4x+5)^5$

(d) $(x^5+9)^3$

(e) $(x^3+3)^4$

2. (*0 points*) Is the following function continuous at $x=1$? Is it differentiable at $x=1$?

$$f(x)=\begin{cases}\frac{2x-10}{4x^2+2} & x<0\\ 5 & 0\le x<1\\ \sqrt{x+24} & x\ge 1\end{cases}$$

3. (*0 points*) Find the first and second derivative of the following functions:

(a) $f(x)=-x^2+3$

(b) $f(x)=\dfrac{x^3}{3}+\dfrac{x^2}{2}+\dfrac{x}{4}$

(c) $r(\theta)=\dfrac{2}{\theta}-\dfrac{3}{\theta^3}+\dfrac{1}{\theta^4}$

4. (*0 points*) At time t seconds, the position of a body moving along the x-axis is $s(t)=t^3-6t^2+9t$ meters.

(a) Find the body's acceleration each time the velocity is zero.

(b) Find the body's velocity each time the acceleration is zero.

5. (*0 points*) The revenue function for selling x units of a product is $R(x)=9x-0.03x^2$.

(a) Find the marginal revenue when production is at $x=10$ (Note: Marginal revenue is given by $R'(x)$)

(b) Estimate the revenue from selling $x=11$ units using your answer from part a.

6. (*0 points*) A company manufactures vinyl records for customers. They charge each customer $5000 plus $5.50 for each record manufactured. In terms of raw materials, it costs the company $3.50 per record for materials and labor, plus $15,000 for equipment and other costs.

(a) Find the Revenue, Cost, and Profit functions for this business.
(Note: Profit=Revenue – Cost)

(b) What is the revenue, cost, and profit from producing 1000 records?