MATH 1325-104 MIDTERM I

INSTRUCTOR: DAVID MILOVICH

Name: _____

- One sheet of notes (double-sided) is allowed.
- A calculator is recommended.
- Show your work.

Date: Thursday, September 15, 2011.

Exercise	Point Possible	Score
1	25	
2	25	
3	25	
4	25	
Total	100	

1. **[25 points]** Use differentials to estimate $1/\sqrt{97}$.

2. [25 points]

(a) What is the derivative of $(2x + 5)/(3x - 4)$?

(b) Find an equation for the tangent line for the curve $y = (2x + 5)/(3x - 4)$ at the point $(2, 4.5)$.

3. [25 points] Suppose a factory makes x microwave ovens at a cost of $100x + 11,000,000$ dollars. The price at which the factory owners can sell x microwaves is $120 - (x/60,000)$ dollars per microwave.

(a) How many microwaves should be produced to maximize profit?

(b) What is the maximum possible profit?

4. [25 points] Let $f(x) = 2 + 6x - x^3$.

(a) What are the intervals on which f is increasing?
(b) What are the intervals on which f is decreasing?
(c) What are the intervals on which f is concave up?
(d) What are the intervals on which f is concave down?