

Name: _____ PID: _____

TA: _____ Sec. No: _____ Sec. Time: _____

Math 20A.

Midterm Exam 2

November 18, 2010

Turn off and put away your cell phone.

No calculators or any other electronic devices are allowed during this exam.

You may use one page of notes, but no books or other assistance during this exam.

Read each question carefully, and answer each question completely.

Show all of your work; no credit will be given for unsupported answers.

Write your solutions clearly and legibly; no credit will be given for illegible solutions.

If any question is not clear, ask for clarification.

#	Points	Score
1	6	
2	6	
3	6	
4	6	
5	12	
Σ	36	

1. (6 points) Differentiate the following functions; you need not simplify.

(a) $f(x) = \ln(\sin^3(x) + 1)$

(b) $g(x) = x^{2 \sin(x)}$

2. (6 points) Find the points on the parabola $y = x^2$ that are closest to the point $(0, 5)$.

3. (6 points) Find all points on the graph of $y^2 + 2x^2 - xy = 14$ where the tangent line is horizontal.

4. (6 points) Sand is pouring from a pipe at the rate of 16 cubic feet per second. The falling sand forms a conical pile whose height is always $\frac{1}{4}$ the diameter of the base. How fast is the height of the sand pile increasing when the pile is 4 feet high?

5. (12 points) Let $h(x) = x^3 - 3x + 1$.

(a) Find the intervals on which h is increasing and decreasing.

(b) Find the local maxima and local minima of h and the points where they occur.

(c) Find the absolute maximum and absolute minimum of h over the interval $[-2, 2]$ and the points where they occur.

(d) Find the intervals on which the graph of h is concave up and concave down and find the inflection points.