MATH 1A MIDTERM 2 (PRACTICE 2)
PROFESSOR PAULIN

DO NOT TURN OVER UNTIL INSTRUCTED TO DO SO.

CALCULATORS ARE NOT PERMITTED

YOU MAY USE YOUR OWN BLANK PAPER FOR ROUGH WORK

SO AS NOT TO DISTURB OTHER STUDENTS, EVERYONE MUST STAY UNTIL THE EXAM IS COMPLETE

REMEMBER THIS EXAM IS GRADED BY A HUMAN BEING. WRITE YOUR SOLUTIONS NEATLY AND COHERENTLY, OR THEY RISK NOT RECEIVING FULL CREDIT

THIS EXAM WILL BE ELECTRONICALLY SCANNED. MAKE SURE YOU WRITE ALL SOLUTIONS IN THE SPACES PROVIDED. YOU MAY WRITE SOLUTIONS ON THE BLANK PAGE AT THE BACK BUT BE SURE TO CLEARLY LABEL THEM

Name: _____

Student ID: _____

GSI's name: _____

This exam consists of 5 questions. Answer the questions in the spaces provided.

1. Calculate the following:

   (a) (10 points)

   $$\frac{d}{dx}\sqrt{\arctan(x^3)+1}$$

   Solution:

   (b) (15 points)

   $$\lim_{x\to\infty} x^{1/x}$$

   Solution:

2. (25 points) Consider the curve given by the equation $4x^2+y^2 = 4$. Determine all tangent lines to this curve which pass through the point $(2, 0)$.

Solution:

3. (25 points) Sketch the following curve. Be sure to indicate asymptotes, local maxima and minima and concavity. Show your working on this page and draw the graph on the next page.

$$y = \frac{e^{2x}}{x}$$

Solution:

Solution (continued) :

4. (25 points) Show that the following equation has exactly one real solution. Be sure to carefully justify you answer clearly stating any results you use from lectures.

$$\arctan(x) = 2 + 7x$$

Solution:

5. (25 points) What is the maximum possible value of $x + 6y$ subject to the constraint $x + y^2 = 4$, where x and y are non-negative real numbers.

Solution:

END OF EXAM