Math 126 - Fall 2018
Exam 2
Nov. 20, 2018

Name: ______________________________

Section: ______________________________

Student ID Number: ______________________________

PAGE 1	11	
PAGE 2	14	
PAGE 3	13	
PAGE 4	12	
Total	50	

- There are 4 pages of questions. Make sure your exam contains all these questions.
- You are allowed to use a Ti-30x IIS Calculator model ONLY (**no other calculators allowed**). And you are allowed one **hand-written** 8.5 by 11 inch page of notes (front and back).
- You must show your work on all problems. The correct answer with no supporting work may result in no credit. **Put a box around your FINAL ANSWER for each problem and cross out any work that you don't want to be graded.** Give exact answers wherever possible.
- Leave your answer in exact form. Simplify standard trig, inverse trig, natural logarithm, and root values. For example, don't leave your answer in the form $\sqrt{4}$ or $\cos(\pi/4)$ or $\frac{7}{2} - \frac{3}{5}$ instead write $\sqrt{4} = 2$ and $\cos(\pi/4) = \sqrt{2}/2$ and $\frac{7}{2} - \frac{3}{5} = \frac{29}{10}$.
- There may be multiple versions of the test. Cheating will not be tolerated. We report all suspicions of cheating to the misconduct board. If you are found guilty of cheating by the misconduct board, then you will get a zero on the exam (and likely face other academic penalties). Keep your eyes on your exam!
- You have 50 minutes to complete the exam. Use your time effectively, spend less than 10 minutes on each page and make sure to leave plenty of time to look at every page. Leave nothing blank, show me what you know!

GOOD LUCK!

1. (11 pts) **As always, give answers in simplified exact form (see cover for examples).**

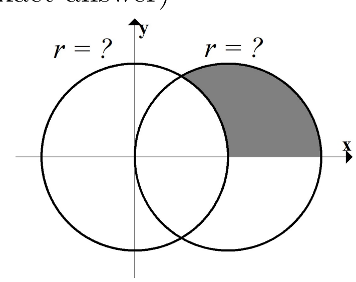
(a) Consider the position vector function $\mathbf{r}(t) = \langle 5t, e^t, e^{-3t} \rangle$. Find all values of t at which the tangential component of acceleration is zero.

(b) Find the tangent plane for $z = f(x, y) = x^5 \sin\left(\frac{\pi x}{y^2}\right) + \ln(y) + 4$ at $(x, y) = (1, 1)$.

2. (14 pts) **The two parts below are not related.**

(a) Find the volume under the plane $8x + 2y - z = 0$, above $z = 0$, and enclosed by $y = x$, $y = 2x$, and $y = 2$. (You MUST draw the region).

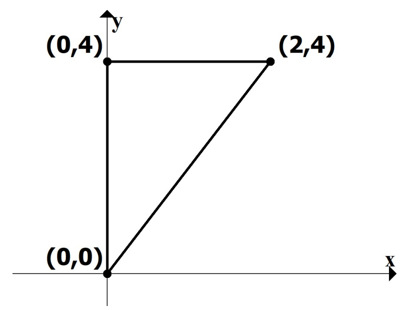
(b) Evaluate $\iint_D 3\,dA$, where D is the region shown which is inside the circle $x^2 + y^2 = 4x$, outside $x^2 + y^2 = 4$ and in the first quadrant. (Give a simplified exact answer)



3. (13 pts) **The two parts below are not related.**

(a) Draw the region of integration and reverse the order of integration for $\int_0^2 \int_{2x^3}^{8x} g(x, y)\, dy\, dx$.

(b) Find the absolute (global) max and min of $z = f(x, y) = 4x^2 - xy + 9$ over the triangular region with corners at $(0, 0)$, $(0, 4)$ and $(2, 4)$. For full credit, you MUST clearly find the critical point(s) and show appropriate work for every boundary. Label your final answers!



4. (12 pts) Find the x, y, z dimensions of the rectangular box with maximum volume in the first octant with all vertices (corners) in the coordinate planes except one vertex (corner) that is on the plane $4x + 3y + z = 12$. (One example of such a rectangular box is shown)

   No points for guessing, you have to appropriately set-up a function and solve for a critical point. At the end, ***clearly*** use the 2nd derivative test to verify your point gives a local max.