

Math 162: Calculus IIA

Second Midterm Exam

November 14, 2019

NAME (please print legibly): _____

Your University ID Number: _____

Your University email _____

Indicate your instructor with a check in the box:

Saul Lubkin	MW 9:00 - 10:15 AM	<input type="checkbox"/>
Doug Ravenel	MWF 10:25 - 11:40 AM	<input type="checkbox"/>
Charles Wolf	MW 12:30 - 1:45 PM	<input type="checkbox"/>
Rufei Ren	MW 4:50 - 6:05 PM	<input type="checkbox"/>

Pledge of Honesty

I affirm that I will not give or receive any unauthorized help on this exam and that all work will be my own.

Signature: _____

- The presence of calculators, cell phones, iPods and other electronic devices at this exam is strictly forbidden. **IF YOU HAVE YOUR PHONE WITH YOU, YOU MUST TURN IT IN TO A PROCTOR BEFORE STARTING THE EXAM. FAILURE TO DO SO WILL BE TREATED AS AN ACADEMIC HONESTY VIOLATION.**
- Show your work and justify your answers. You may not receive full credit for a correct answer if insufficient work is shown or insufficient justification is given.
- Put your answers in the space provided at the bottom of each page or half page.
- You are responsible for checking that this exam has all 12 pages.

1. (20 points)

Find the arc length of the curve described by the parametric equations

$$x = 1 + 3t^2, \quad y = 4 + 2t^3$$

between the points with Cartesian coordinates $(1, 4)$ and $(4, 6)$.

ANSWER:

2. (20 points) Determine if the following sequences are convergent or divergent and explain why. If it is convergent, give its limit.

(a) $\left\{ \frac{n \cos(n)}{n^2+1} \mid n \geq 0 \right\}$.

ANSWER:

(b) $\left\{ n^3 \sin\left(\frac{1}{n}\right) \mid n \geq 1 \right\}$

ANSWER:

3. (20 points) Compute the following integral:

$$\int \frac{1}{(x^2 - 1)^2} dx.$$

ANSWER:

4. (20 points)

- (a) Compute the area of surface of revolution obtained by rotating the curve $y = \sqrt{4 - x^2}$ around the x -axis.

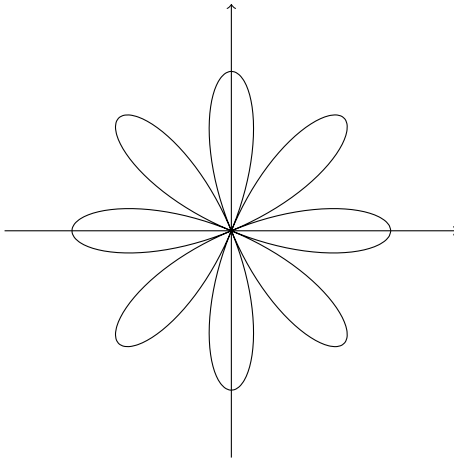
ANSWER:

(b) Do the same for the curve $y = 1 - |x|$, $-1 \leq x \leq 1$.

ANSWER:

5. (20 points)

(a) Find the area of **one petal** of the polar rose $r = 2 \cos(4\theta)$ pictured below.



ANSWER:

- (b) The parametric curve given by $x = 4t^3 - 3t$, $y = t^2 + 1$ intersects the y -axis at 3 different values of t . What are the **equations of the tangent lines** to the curve at each of these points?

ANSWER:

Scratch paper

Scratch paper