

Math 1C Quiz 4

Sat Jun 18, 2022 DUE Fri Jun 24, 2022 @ 2pm in Canvas

SCORE: _____ / 35 POINTS

INSTRUCTIONS

- [A] For this test, you may consult your lecture notes for sections 10.1-10.4, 11.1-11.10, 12.1-12.5, the Zoom recordings for sections 10.1-10.4, 11.1-11.10, 12.1-12.5, linked on the instructor's website, your textbook sections 10.1-10.4, 11.1-11.10, 12.1-12.5, and the homework you did for those sections. You may **not** simply use the answer of a textbook exercise as justification – you must write a complete solution for that answer in your work.

You may **not** use any other material located on the instructor's website nor covered in any other sections of your textbook.

You may **not** consult any person, nor any written/printed material, website, software, app or other electronic resource, nor any calculator (unless instructed), computer, phone or other electronic device.

- [B] For each derivative that requires the product, quotient and/or chain rule, you must show all the factors and terms from the rule before you simplify.

eg.
$$\frac{d}{dx} \frac{xe^{2x}}{1+e^x} = \frac{(1(e^{2x}) + xe^{2x}(2))(1+e^x) - xe^{2x}(e^x)}{(1+e^x)^2} \quad \leftarrow \text{THIS STEP IS REQUIRED}$$

$$= \frac{e^{2x}((1+2x)(1+e^x) - xe^x)}{(1+e^x)^2} = \frac{e^{2x}(1+2x+e^x+xe^x)}{(1+e^x)^2}$$

For each integral that requires u – substitution, you must show the value of u and the resulting integral in terms of u .

eg.
$$\int 3x(2x^2 - 1)^5 dx = \int \frac{3}{4} u^5 du \quad (u = 2x^2 - 1)$$

$$= \frac{1}{8}(2x^2 - 1)^6 + C \quad \leftarrow \text{MINIMUM WORK REQUIRED}$$

For each integral that requires integration by parts, you must show the work (table method OK).

For each integral that requires polynomial long division, partial fractions decomposition or trigonometric substitution, you must show all work.

The general rule is that, **if you can't do the work in your head without writing something down, write it in your test.**

- [C] **Handwrite** your solutions to the questions on clean 8½" × 11" paper (or equivalent).
- [D] Your solutions to the questions must be in the same order as the questions in this test. (You may write the solutions to each question on separate pages, and sort them in order afterwards.)
- [E] You do not need to copy the questions onto your paper. Just show your organized and clearly written work and final answers.
- [F] Writing which is illegible to the instructor will earn 0 points.
- [G] All final algebraic answers must be completely simplified to receive full credit.
- [H] All work must be properly algebraically justified and use proper mathematical notation as shown in lecture, not simply based on scratch work, intuition or "handwaving".

Imagine yourself tutoring a struggling Math 1C student. They should be able to understand your algebraic reasoning based on your writing alone.

- [I] Upload a **single** clear & legible PDF of your completed test to Canvas no later than Fri Jun 24 @ 2pm Pacific Time.

All work submitted after that will earn 0 points.

QUESTIONS

- [1] Legibly **handwrite** the text from the box below (do **not** write in cursive), and sign your name directly below your writing.
If you skip this step or your writing is illegible to me, your quiz will not be counted for credit.

“I am a trustworthy, principled and honorable person.
I pledge to uphold the De Anza College Student Code of Conduct.

My signature below confirms that the work shown on this test is strictly my own.
Other than the resources listed in Instruction [A] of this test,
I did not consult any person, nor any printed/written material, app, software, website or other electronic resource,
nor any computer, phone, calculator or other electronic device.”

NOTE: The De Anza College Student Code of Conduct can be found at
<https://go.boarddocs.com/ca/fhda/Board.nsf/goto?open&id=9U2UC77B2DA5>

0 points for all questions in which it is evident you used a calculator for any part of your work
Use fractions, radicals, e and π , not decimals in your work and final answers

Read Instruction [A] above for which resources are not to be used during your test
and how certain resources are to be used

Read Instructions [B] and [H] above for required standard of writing

- [2] [9 POINTS]

Determine if $\sum_{n=1}^{\infty} \frac{\sin n}{2^n - 1}$ converges or diverges.

Show analytically how you reached your conclusion. Justify properly as shown in lecture.

- [3] [6 POINTS]

Find the Maclaurin series (in sigma notation) and radius of convergence for $f(x) = \frac{x}{(2+x)^2}$.

Simplify your coefficients completely.

- [4] [4 POINTS]

Find the equations of the tangent lines to the parametric curve $x = 4 - t^3$ and $y = 2t - t^2$ at all x -intercepts.

- [5] [10 POINTS]

Find the area of the region that lies inside both the polar curves $r = 1 + \cos \theta$ and $r = 3 \cos \theta$ simultaneously.
Your final answer must be a number, not an integral nor a sum/difference of integrals.

NOTE: You may use symmetry to reduce your work, if you prove analytically the relevant symmetry.
You will only need to find intersection points where the θ -values are the same on both curves.

All θ -values used must be between 0 and 2π .

- [6] [6 POINTS]

[a] Find symmetric equations of the line through the point $(0, -1, 4)$ which is parallel to $2x + 2z = 3$ and $4x + y + z = -5$.

$$x = t + 1$$

[b] Determine if the line in [a] and the line $y = 2 - t$ intersect, are parallel or are skew.

$$z = -2t$$