

Math 126 C - Autumn 2021

Midterm Exam Number Two

November 18, 2021

*Please try to write your name as it appears on the Canvas roster.
This makes it easier to import scans to Gradescope.*

Name: _____

Student ID no. : _____

Signature: _____

1	7	
2	8	
3	15	
4	15	
5	8	
6	7	
Total	60	

*This grid is purely decorative.
The exam is graded online.*

- This exam consists of **SIX** problems on **FOUR** double-sided pages. The fourth page is left blank for scratch work.
- Show all work for full credit.
- You may use a TI-30X IIS (or equivalent) calculator during this exam. Other calculators and electronic devices are not permitted.
- You do not need to simplify your answers.
- If you use a trial-and-error or guess-and-check method when a more rigorous method is available, you will not receive full credit.
- | |
|------------|
| Draw a box |
|------------|

 around your final answer to each problem.
- **Do not write within 1 centimeter of the edge!** Your exam will be scanned for grading.
- If you run out of room, write on one of the scratch work pages **and indicate that you have done so**. If you still need more room, raise your hand and ask for an extra page.
- You may use one hand-written double-sided 8.5" by 11" page of notes.
- You have 50 minutes to complete the exam.

You may use this page for scratch-work.

All work on this page will be ignored unless you write & circle “see first page” below a problem.

1. [7 points] A particle moves with position vector $\mathbf{r}(t) = \langle 8t + 1, t^2 - 4t, \frac{1}{2}t^3 \rangle$.

Find the tangential and normal components of acceleration of the particle at time $t = 2$.

2. [8 points] Let \mathcal{S} be the surface

$$xz + \sqrt{z} - 2xy = 6.$$

Find the equation of the plane tangent to \mathcal{S} at the point $(2, 1, 4)$.

3. [15 points] Consider the function $f(x, y) = xy^2 - 2xy + x^2$.

Find all critical points of f , and **classify them** as local minima, local maxima, or saddle points.

4. **[15 points]** Let f be the function $f(x, y) = xy^2 + x^2$, and let \mathcal{D} be closed disc of radius 1 centered at the origin.

Find the absolute minimum and maximum values of f on \mathcal{D} .

5. **[8 points]** Evaluate $\int_0^5 \int_3^4 (2xy^2 + e^y) dy dx$.

6. **[7 points]** Rewrite the following integral after reversing the order of integration.
Do not try to evaluate the integral! Just reverse the order of integration.

$$\int_2^3 \int_{\frac{12}{x}}^{10-2x} \sin(y^2) dy dx$$

You may use this page for scratch-work.

All work on this page will be ignored unless you write & circle “see back page” below a problem.

You may use this page for scratch-work.

All work on this page will be ignored unless you write & circle “see back page” below a problem.