Math 120 A - Spring 2024
Midterm Exam Number One
April 18th, 2024

Name: _____ Student ID no. : _____

Signature: _____ Section: _____

1	15	
2	15	
3	15	
4	15	
Total	60	

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

- This exam consists of **FOUR** 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 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.
- Write your final answer in the provided blank, or at least make it easy to find.
- **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. **[15 points]** Vision Transit is building a new light rail track, which is a straight line.
   Part of the track has to cross a circular lake with radius 13 km.
   One end of the track, at Kudjins Park Station, is at the westernmost point of the lake.
   The other end, in Vellebue, is 17 km east and 20 km north of the center of the lake.
   It costs $\$5$ M per km to build track along the lake, and $\$2$ M per km to build track on land.
   How much does it cost to build the whole track?

Total cost: $ _____ M

2. Robin and Victoire are walking around the coordinate plane.

   (a) **[6 points]** Robin starts at the point $(7, 2)$, and walks towards the point $(-3, -3)$ in a straight line at a constant speed, reaching it after 8 seconds.

   Write parametric equations for Robin's location after t seconds.

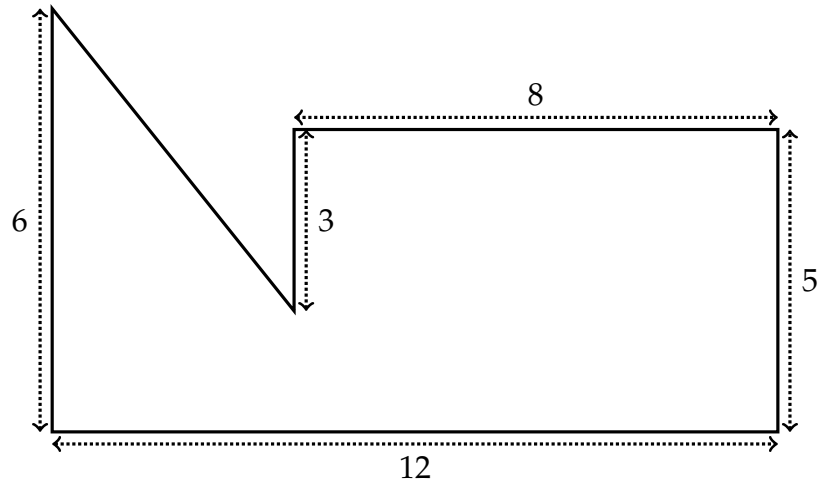
   Parametric equations: _____

   (b) **[9 points]** Victoire starts at the point $(-5, 6)$ and walks in a straight line towards the point where Robin crosses the x-axis, at a constant speed of 2 units per second.

   Write parametric equations for Victoire's location after t seconds.

   Parametric equations: _____

3. **[15 points]** Precalculus Park is shaped like a weird hexagon, like this:



Suppose a vertical line is drawn x units from the left edge of the park.

Write a multipart function $A(x)$ for the area to the left of the line.

$A(x) =$ _____

4. Suppose f is a quadratic function with the following properties:

   - $f(2) = -5$
   - $f(5) = 16$
   - The vertex of the parabola $y = f(x)$ has an x-coordinate of 4.

   (a) **[12 points]** Write a formula for $f(x)$.

$f(x) =$ _____

   (b) **[3 points]** What is the range of f?

Range: _____

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.

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