MAT 136: Calculus I
Weekly Homework 7

NAME:

Instructions

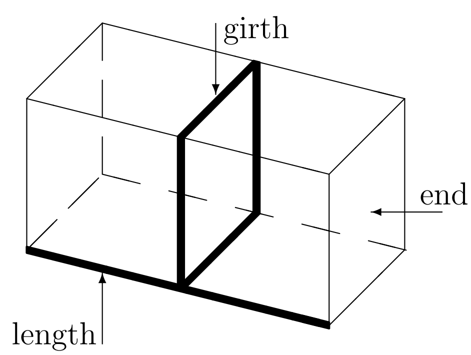
You are allowed and encouraged to work together on homework. Yet, each student is expected to turn in his or her own work.

Reviewing material from previous courses and looking up definitions and theorems you may have forgotten is fair game. However, when it comes to completing assignments for this course, you should *not* look to resources outside the context of this course for help. That is, you should not be consulting the web, other texts, other faculty, or students outside of our course in an attempt to find solutions to the problems you are assigned. This includes Chegg and Course Hero. On the other hand, you may use each other, Discord, me, and your own intuition. **If you feel you need additional resources, please come talk to me and we will come up with an appropriate plan of action.** Please read NAU's Academic Integrity Policy.

Complete each of the following exercises. Your solutions should be complete and neatly written. In particular, you should show all of your work. Write your solutions on your own paper or prepare them digitally. This assignment is due at beginning of class on **Thursday, November 17**.

Problems

1. The U.S. Postal Service will accept a box for domestic shipment only if the sum of its length and girth (distance around) does not exceed 108 inches. What dimensions (length and width) will give a box with a square end the largest possible volume?



2. A 20 cm piece of wire could be cut into two pieces. One piece is used to form a square and the other an equilateral triangle or all 20 cm could be used for just the square or just the triangle. How should the wire be cut to maximize the total area enclosed by the square and triangle? To minimize the area?

3. Compute each of the following indefinite integrals.

   (a) $\displaystyle\int 3x^2 + 5x^{-2}\ dx$

   (b) $\displaystyle\int \frac{x^2+4x}{x^3}\ dx$

   (c) $\displaystyle\int \sec(x)(\sec(x)+\tan(x))\ dx$

   (d) $\displaystyle\int \sin(3x)\ dx$

4. Compute the value of each of the following definite integrals by interpreting them in terms of areas of know geometric shapes.

   (a) $\displaystyle\int_{-1}^{4} 2-2x\ dx$

   (b) $\displaystyle\int_{-1}^{1} \sqrt{1-x^2}\ dx$