TEST PREP on 8.1 and 8.3 - Dr. Loveless

As we transition to the last few weeks of the term, the examples will come from the math department Math 125 Final Exam Archive. Note that these two sections are about these:

$$\text{Arc Length } = \int_a^b \sqrt{1+(f'(x))^2}\,dx\ , \qquad \text{Center of Mass}: \quad \bar{x} = \frac{\int_a^b x f(x)\,dx}{\int_a^b f(x)\,dx}\ , \quad \bar{y} = \frac{\int_a^b \frac{1}{2}(f(x))^2\,dx}{\int_a^b f(x)\,dx}$$

Fall 2022 - Final Exam - Problem 8 - A typical arc length problem.

8. (a) Set up a definite integral for the arc length of the curve $y = 3x^3$ for $0 \le x \le 1$. DO NOT EVALUATE THIS INTEGRAL.

   (b) Approximate the integral in part (a) using the Trapezoid Rule with $n = 3$ subintervals. Give your answer in exact form (in terms of square roots, not decimals).

Winter 2024 - Final Exam - Problem 4 - A simplify/compute arc length challenge.

4. Determine the arc length of the curve $y = \dfrac{x^3}{3} + \dfrac{1}{4x} - 5$ from $x = \frac{1}{4}$ to $x = 1$.

Winter 2023 - Final Exam - Problem 8 - A typical centroid problem.

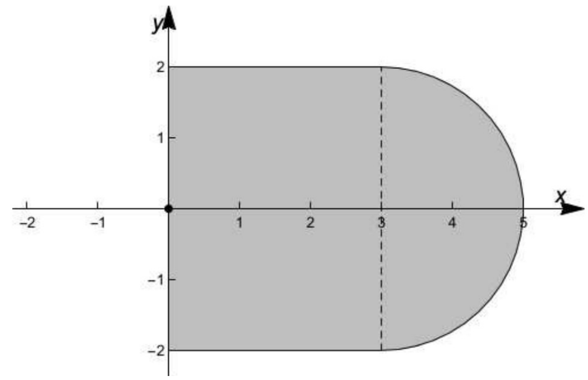
8. Find the x-coordinate of the centroid of the region enclosed by $y = \dfrac{1}{9 - x^2}$, $x = 0$, $x = 2$ and the x-axis.

Winter 2024 - Final Exam - Problem 8 - And another.

8. Let R be the region bounded by the curves $y = 4\sin(x)$ and $y = 2\sin(x)$ and between $x = 0$ and $x = \pi$. By symmetry, we can tell that the x-coordinate of the centroid of R is $\pi/2$. Find the y-coordinate of the centroid of R.

Winter 2016 - Final Exam - Problem 3 - A centroid with a multipart region.

3. Consider the region in the xy-plane fomed by a rectangle of height 4 and width 3 and a half-disk of radius 2 centered at (3,0), as shown in the figure. Compute the x-coordinate of the centroid of the region.



Fall 2017 - Final Exam - Problem 5 - Another centroid with a multipart region.

5. Find the (x, y) coordinates of the center of mass of the region shown below.