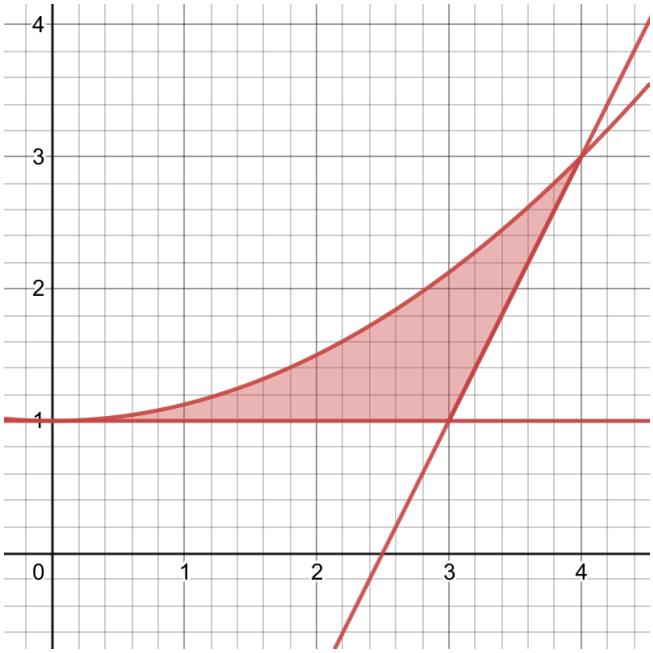
Practice Midterm 2

Math 252

Exercise 1: Let $f(x)$ be a differentiable function with a continuous derivative. What is the arc length of f between $x = 2$ and $x = 5$?

Exercise 2: The shaded region below is bounded by the curves $y = 1$, $y = 2x - 5$, and $y = \frac{1}{8}x^2 + 1$. Find the shaded area.



Exercise 3: A tank in the shape of an inverted cone (like the problem from homework 5) has height 8 meters, radius 2 meters, and is filled up to 5 meters with water (weight density 9800 $\frac{N}{m^3}$). Find the work done by pumping it all out.

Exercise 4: Let R be the region bounded by $\sin(x)$ and $\frac{4}{\pi^2}x^2$ on $[0, \frac{\pi}{2}]$. Find the volume of the solid of revolution given by rotating R about the x-axis (you may use any method you like).

Exercise 5: Set up, but do not solve, the integral for the surface area of the solid of revolution given by rotating $\ln(x)$ for $2 \leq x \leq 5$ about the y-axis.

Exercise 6: Find $\int t^2 \ln(t)\ dt$.