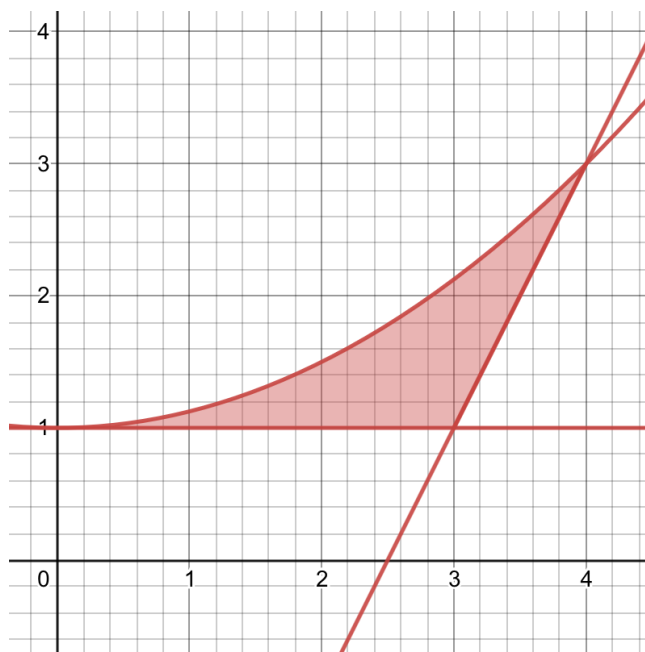


Practice Midterm 2

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 5-meter long rope is hanging straight down from a platform. x meters **below the platform**, the weight density of the rope is $100 - \sqrt{x}$ Newtons per meter. What is the total work done by pulling the rope up onto the platform? Drawing a picture might be helpful.

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).

Note: this is a long problem. On an actual exam, I would likely only ask you to set up the integral and not solve it.

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: Let U be the region bounded by e^x and e^{-x^2} . Set up, but do not solve, the three integrals necessary to find the centroid of U .