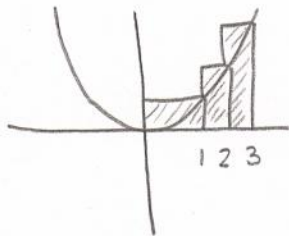


NAME: Solution

MAC 2311 Section 3071
Quiz Nine

Please show all of your work in a NEAT and ORGANIZED fashion.

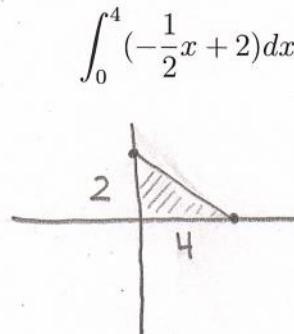
1. (2 points) Estimate the area under the graph of $f(x) = x^2$ from $x = 0$ to $x = 3$, using three approximating rectangles and right endpoints. Sketch the graph and the rectangles.



$$\begin{aligned} \text{Area} &= \frac{3-0}{3} (f(1) + f(2) + f(3)) \\ &= 1 (1 + 4 + 9) \\ &= 14 \end{aligned}$$

2. (2 points) Evaluate the integral by interpreting it in terms of areas.

$$\begin{aligned} y &= -\frac{1}{2}x + 2 \\ x\text{-int: } &(4, 0) \\ y\text{-int: } &(0, 2) \end{aligned}$$



$$\begin{aligned} \int_0^4 \left(-\frac{1}{2}x + 2\right) dx &= \\ \text{area of triangle} &= \\ \frac{1}{2}(2)(4) &= 4 \end{aligned}$$

3. (2 points) Given that $\int_0^1 (\sqrt{1-x^2}) dx = \frac{\pi}{4}$, use the properties of integrals to evaluate $\int_0^1 (2 + 3\sqrt{1-x^2}) dx$.

$$\begin{aligned} \int_0^1 (2 + 3\sqrt{1-x^2}) dx &= \int_0^1 2 dx + 3 \int_0^1 \sqrt{1-x^2} dx \\ &= 2(1-0) + 3\left(\frac{\pi}{4}\right) \\ &= 2 + \frac{3\pi}{4} = \frac{8+3\pi}{4} \end{aligned}$$