NAME:  Solution

MAC 2311 Section 6462
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 \( x = 1 \) to \( x = 4 \), using three approximating rectangles and left endpoints. Sketch the graph and the rectangles.

\[
\text{Area} = \frac{4-1}{3} \left( f(1) + f(2) + f(3) \right) = \frac{1}{3} (1 + 4 + 9) = 14
\]

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

\[
\int_0^6 (-\frac{1}{2}x + 3)dx
\]

\[
\text{y} = -\frac{1}{2}x + 3
\]

\[
\text{x-inter: (6, 0)}
\]

\[
\text{y-inter: (0, 3)}
\]

\[
\int_0^6 (-\frac{1}{2}x + 3)dx = \frac{1}{2} \text{ (6)(3)} = 9
\]

3. (2 points) Given that \( \int_0^1 (\sqrt{1-x^2})dx = \frac{\pi}{4} \), use the properties of integrals to evaluate \( \int_0^1 (5 + 2\sqrt{1-x^2})dx \).

\[
\int_0^1 (5 + 2\sqrt{1-x^2})dx = \int_0^1 5dx + 2\int_0^1 \sqrt{1-x^2} \, dx
\]

\[
= 5(1-0) + 2 \left( \frac{\pi}{4} \right)
\]

\[
= 5 + \frac{\pi}{2} = \frac{10 + \pi}{2}
\]