MTH 1126 - Test #2

SPRING 2023

Pat Rossi Name _____

Instructions. Show CLEARLY how you arrive at your answers.

Do Exercises #1, 2. From Exercises #3-5, select two.

1. Use the "$f - g$" method to compute the area bounded by the graphs of $f(x) = x^2 - 5$ and $g(x) = 3 - x^2$.

2. Find the area bounded by the graphs of $f(x) = 3x$ and $g(x) = x^2$. (Partition the appropriate interval, sketch the i^{th} rectangle, build the Riemann Sum, derive the appropriate integral.)

3. Use the "shell method" to compute the volume of the solid of revolution generated by revolving the region bounded by the graphs of $y = x - 1$, $y = -x + 1$, and $x = 2$, about the y-axis. (For your information: the equation of the y-axis is $x = 0$.)

   Use the "five step method" (partition the interval, sketch the i^{th} rectangle, form the sum, take the limit)

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4. Use the "disc method" to compute the volume of the solid of revolution generated by revolving the region described below about the x-axis.

   The region lies above the x-axis and is bounded by the graph $y = \sqrt{9 - x^2}$, and the x-axis.

   Use the "five step method" (partition the interval, sketch the i^{th} rectangle, form the sum, take the limit)

5. Compute the work done in filling the reservoir of a water tower, though a hole in the bottom of the reservoir. The reservoir is a cylindrical tank of height 10 ft and radius 5 ft. The base of the reservoir is 20 ft above the level of the pond from which the water is pumped. (Assume that water weighs $\rho = 100\frac{\text{lbs}}{\text{ft}^3}$)