MTH 1126 - Test #2 (11am Class)

SPRING 2024

Pat Rossi Name ______________________________

Instructions. Show CLEARLY how you arrive at your answers.

1. Use the "$f-g$" method to compute the area bounded by the graphs of $f(x)=-x^2+4$ and $g(x)=x+2$.

2. Find the area bounded by the graphs of $f(x) = 4x$ 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 $y = \sqrt{x}$, and $y = x^2$, 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$^{\text{th}}$ 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 $y = 2 - x^2$ and $y = 1$.

   Use the “five step method” (partition the interval, sketch the i$^{\text{th}}$ rectangle, form the sum, take the limit)

From exercises 5 and 6, select one.

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 "cone-shaped" tank of height 20 ft and radius 5 ft at the top. The base of the reservoir is 50 ft above the level of the pond from which the water is pumped. (Assume that water weighs $\rho = 100 \frac{\mathrm{1bs}}{\mathrm{ft}^3}$)

6. 20 lb of force is required to stretch a spring 1ft past the point of equilibrium. Compute the work done in stretching the spring a distance of 3 ft past the point of equilibrium.