MTH 1126 - Practice Test #2_1

FALL 2015

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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 $g(x)=2x-1$.

2. Suppose that $\int_2^8 f(x)\,dx=9$ and that $\int_4^2 f(x)\,dx=4$. Compute $\int_4^8 f(x)\,dx$.

3. Find the area bounded by the graphs of $f(x)=\sqrt{x}$ and $g(x)=\frac{1}{2}x$. (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

4. 10 pounds of force is required to stretch a spring 6 inches past the point of equilibrium. How much work is done stretching the spring 3 inches past the point of equilibrium? (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

5. A cable, weighing 1 pound per foot length, is used to pull a 50 pound weight from ground level to a height of 100 feet, using a winch. How much work is done in the process? (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

6. A water tower has a spherical reservior of radius 10 feet. If the bottom of the reservior is 50 feet from ground level, how much work is done filling the reservior by pumping water into the reservior through a hole in the bottom? (Assume that water weighs 100 pounds per cubic foot.) (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

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

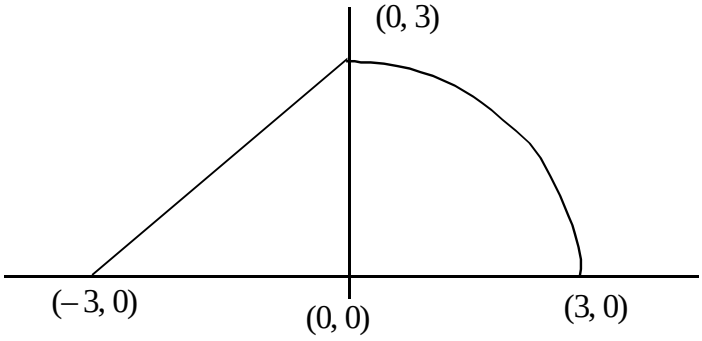
8. Find the area bounded by the graphs of $f(x)=x^2-2$ and $g(x)=2x+1$. (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

9. Use the "$f-g$" method to compute the area bounded by the graphs of $f(x)=x^3$ and $g(x)=4x$.

10. Suppose that $\int_2^8 (f(x)+g(x))\,dx=10$; $\int_2^8 g(x)\,dx=5$; and that $\int_4^2 f(x)\,dx=4$. Compute $\int_4^8 f(x)\,dx$.

11. Find the area bounded by the graphs of $f(x) = 1 - x^2$ and $g(x) = x^2 - 1$. (Partition the appropriate interval, build the Riemann Sum, derive the appropriate integral.)

12. The graph of $f(x)$ is shown below. Compute $\int_{-3}^{3} f(x)\,dx$



13. Use the "$f - g$" method to compute the area bounded by the graphs of the functions $f(x) = x^2 + 2$; and $g(x) = x + 8$.

14. Compute the arclength of the graph of the function $f(x) = x^{\frac{3}{2}} + 6$ from the point $(1, 7)$ and $(4, 14)$.

For problems 15 to 16, use the "five step method" (partition the interval, form the sum, take the limit)

15. Use the "disc method" to compute the volume of the solid of revolution generated by revolving the region bounded by the graph $f(x) = 1 - x^2$ and the x-axis about the line $y = -1$.

16. Use the "shell method" to compute the volume of the solid of revolution generated by revolving the region bounded by the graph $f(x) = x^3 + 1$, the y-axis, and the line $y = 9$, about the line $x = -1$.

17. $\int_0^5 f(x)\,dx = 8$ and $\int_5^3 2f(x)\,dx = 8$. Compute $\int_0^3 f(x)\,dx$.

18. Given that $x = \frac{y^3}{3} + \frac{1}{4y}$; compute the length of the arc from the point $\left(\frac{7}{12}, 1\right)$ to the point $\left(\frac{67}{24}, 2\right)$