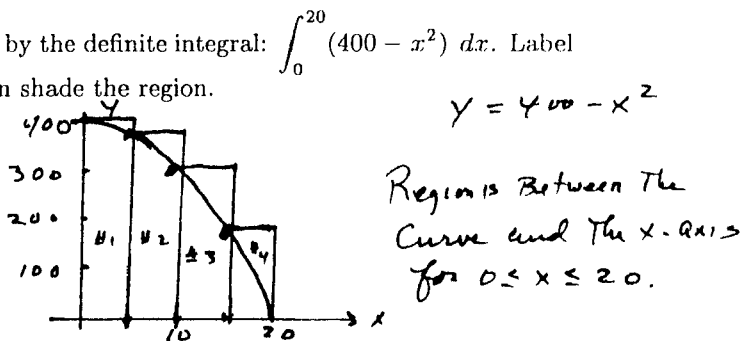


MTHU131 Quiz 8 Review

1a. Make a careful sketch of the region whose area is given by the definite integral: $\int_0^{20} (400 - x^2) dx$. Label the boundary curves and corner points of the region. Then shade the region.



1b. Estimate the area of the region in part a) using the 4 left rectangle approximation. Show work.

$$\begin{array}{l} x_0 = 0 \quad y_0 = 400 \\ x_1 = 5 \quad y_1 = 375 \\ x_2 = 10 \quad y_2 = 300 \\ x_3 = 15 \quad y_3 = 175 \end{array} \quad \begin{array}{l} 5(400) + 5(375) + 5(300) + 5(175) = 6250 \\ \#1 \quad \quad \#2 \quad \quad \#3 \quad \quad \#4 \end{array}$$

Approximation is the Sum of The 4 rectangles

2. Suppose that $G'(x) = g(x)$ for all x , and $g(1) = 7$, $g(3) = 5$, $G(1) = 2$ and $G(3) = 19$. Calculate

$$\int_1^3 g(x) dx. \text{ Show work.}$$

$$\int_1^3 g(x) dx = \int_1^3 G'(x) dx = G(3) - G(1) = 19 - 2 = 17$$

In problems 3-5, evaluate the given integral. Give numerical answers to four decimal places. Show all work. Use your calculator only to perform basic arithmetic. Do not use *fnInt*.

$$3. \int_0^3 4.03(1.05)^x dx = \frac{4.03(1.05)^x}{\ln(1.05)} \Big|_0^3 = \frac{4.03}{\ln(1.05)} (1.05^3 - 1.05^0) = 13.0196$$

$$4. \int_1^4 (3\sqrt{x} + \frac{1}{2x} - \frac{1}{x^3}) dx = \left(3 \cdot \frac{2}{3} x^{3/2} + \frac{1}{2} \ln|x| + \frac{1}{2} x^{-2} \right) \Big|_1^4 = \left(2 \cdot 4^{3/2} + \frac{1}{2} \ln 4 + \frac{1}{2} \cdot \frac{1}{16} \right) - \left(2 + 0 + \frac{1}{2} \right) = 16 + \frac{1}{2} \ln 4 + \frac{1}{32} - \frac{5}{2} = 14.2244$$

$$5. \int_{-1}^{10} 7.26e^{-0.1x} dx = \frac{7.26}{-0.1} e^{-0.1x} \Big|_{-1}^{10} = -72.6 (e^{-1} - e^{0.1}) = 53.527...$$

6. Let $E(t)$ be the rate of change of XYZ corporation's profit in thousands of dollars per year, t years after the year 1995. Write a sentence with units explaining the practical meaning of the following integral:

$$\int_2^6 E(t) dt.$$

The total Change in Profits for XYZ Corporation for the years 1997 Through 2001, measured in thousands of dollars.