MAC2311 Class Number 15498
QUIZ 13 (Last Quiz, Woohoo!)
4/18/2019

Name: SOLUTIONS

1. For the function $f(x) = x^2 + 1$ on $[0, 3]$ and using $n = 3$, calculate the left endpoint approximation.

$\Delta x = \frac{b-a}{n} = \frac{3-0}{3} = \frac{3}{3} = 1$

SINCE $\Delta x = 1 \Rightarrow x_0 = 0$, $x_1 = 1$, $x_2 = 2$

- $f(x_0) = x_0^2 + 1 = 0^2 + 1 = 1$
- $f(x_1) = x_1^2 + 1 = 1^2 + 1 = 2$
- $f(x_2) = x_2^2 + 1 = 2^2 + 1 = 5$

$\Rightarrow$ LEFT END POINT APPROXIMATION

$L_3 = f(x_0)\Delta x + f(x_1)\Delta x + f(x_2)\Delta x$

$L_3 = (1)(1) + (2)(1) + (5)(1)$

$L_3 = 1 + 2 + 5 \Rightarrow \boxed{L_3 = 8}$

2. Calculate the following integral:

$$\int_0^2 (x+1)(3x+1)\,dx$$

FOIL!

$$\int_0^2 (x+1)(3x+1)\,dx = \int_0^2 3x^2 + 4x + 1\,dx = \frac{3x^{2+1}}{2+1} + \frac{4x^{1+1}}{1+1} + x \Big|_0^2$$

$$= \frac{3x^3}{3} + \frac{4x^2}{2} + x \Big|_0^2 = x^3 + 2x^2 + x \Big|_0^2 = \left[2^3 + 2(2^2) + 2\right] - \left[0^3 + 2(0^2) + 0\right] = 8 + 8 + 2 = \boxed{18}$$

3. Calculate the following integral:

$$\int_0^{\ln(4)} 2e^x\,dx$$

$$= 2e^x \Big|_0^{\ln(4)}$$

$$= 2e^{\ln(4)} - 2e^0$$

$$= 2(4) - 2(1) = 8 - 2 = \boxed{6}$$