

Mock Quiz

Math 12002

Analytic Geometry & Calculus I

Fall 2016

Quiz 10

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Name: Key

Quiz Score: /10

1. (2pts) Write the limit definition of $\int_a^b f(x) dx$.

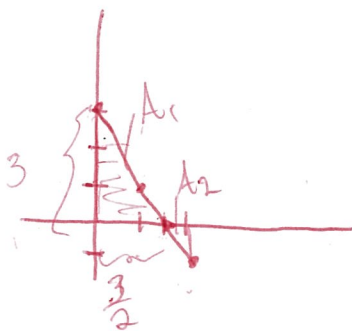
$$\int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x \quad \text{where} \quad \Delta x = \frac{b-a}{n}$$
$$x_i = a + i \Delta x$$

2. (6pts) Use the limit definition to find $\int_0^2 (3-2x) dx$. Graph the function $f(x) = 3-2x$ to check your answer.

$$\int_0^2 (3-2x) dx = \lim_{n \rightarrow \infty} \sum_{i=1}^n (3-2x_i) \Delta x = \lim_{n \rightarrow \infty} \sum_{i=1}^n \left(3-2 \frac{i2}{n}\right) \left(\frac{2}{n}\right)$$

$$= \lim_{n \rightarrow \infty} \left[\frac{3(2)}{n} \sum_{i=1}^n 1 - 2 \left(\frac{2}{n}\right)^2 \sum_{i=1}^n i \right]$$

$$= \lim_{n \rightarrow \infty} \left[6 - \frac{8}{n^2} \frac{n(n+1)}{2} \right] = \lim_{n \rightarrow \infty} \left[6 - \frac{4(n+1)}{n} \right] = 6 - 4 = \boxed{2}$$



$$\int_0^2 (3-2x) dx = A_1 - A_2$$

$$= \frac{1}{2}(3) \cdot \frac{3}{2} - \frac{1}{2}(1) \left(\frac{1}{2}\right)$$

$$= \frac{9}{4} - \frac{1}{4} = \frac{8}{4} = 2$$

3. (2pts) Find $\int (3-2x) dx$.

$$\int (3-2x) dx = 3x - x^2 + C$$