Math 12002 | Analytic Geometry & Calculus I | Fall 2016

Quiz 10 | Matt Alexander

Name: Key | Quiz Score: ______ /10

1. (6pts) Use the limit definition to find $\int_0^4 (x-2)\,dx$.

$$\int_0^4 (x-2)dx = \int_0^4 x\,dx - \int_0^4 2\,dx$$

$$= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \qquad x_i = a + i\Delta x \quad \Delta x = \frac{4}{n}$$

$$= \lim_{n\to\infty} \left(\sum_{i=1}^{n} \frac{i4}{n} \cdot \frac{4}{n} - \sum_{i=1}^{n} 2 \cdot \frac{4}{n} \right)$$

$$= \lim_{n\to\infty} \left(\frac{16}{n^2} \sum_{i=1}^{n} i - \frac{8}{n} \sum_{i=1}^{n} 1 \right)$$

$$= \lim_{n\to\infty} \left(\frac{16}{n^2} \frac{n(n+1)}{2} - \frac{8}{n} \cdot n \right)$$

$$= \lim_{n\to\infty} \left(\frac{8(n+1)}{n} - 8 \right) = 8 - 8 = \underline{0}$$

2. (4pts) Find $\int_0^4 (x-2)\,dx$ using the evaluation theorem. $\int (x-2)\,dx = \frac{x^2}{2} - 2x + C$

$$\int_0^4 (x-2)dx = \frac{1}{2}x^2 - 2x \Big|_0^4 = \frac{1}{2}(16) - 8 - [0-0]$$

$$= 8 - 8$$

$$= \underline{0}$$