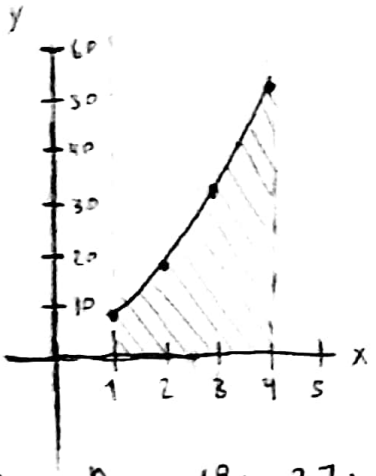
Tarea 1. Semana 27 de febrero al 3 de marzo 2023

Tema: Área bajo la curva empleando sumas de Riemann

Nombre: Vázquez Blancas César Said 6/Marzo/2022

Instrucciones: Calcula el área comprendida entre la función $f(x) = 3x^2 + 5.$ y el eje x, en el intervalo [1,4]. Empleé Sumas de Riemann.

Grafica la función.



$A = \lim_{n\to\infty} \sum_{i=1}^{n} (f(x))\,\Delta X$ $\quad [1, 4]$ (a, b)

$\Delta x = \frac{b-a}{n} = \frac{4-1}{n} = \frac{3}{n}$ $\quad x_i = a + i\Delta x = 1 + \frac{3}{n} i$

$f(x) = 3(1 + \frac{3}{n} i)^2 + 5$

$f(x) = 3(1 + \frac{6}{n} i + \frac{9}{n^2} i^2) + 5$

$f(x) = 3 + \frac{18}{n} i + \frac{27}{n^2} i^2 + 5$

$f(x) = 8 + \frac{18}{n} i + \frac{27}{n^2} i^2$

$A = \lim_{n\to\infty} \sum_{i=1}^{n} (8 + \frac{18}{n} i + \frac{27}{n^2} i^2)(\frac{3}{n})$

$A = \lim_{n\to\infty} \sum_{i=1}^{n} (\frac{24}{n} + \frac{54}{n^2} i + \frac{81}{n^3} i^2)$

$A = \lim_{n\to\infty} \frac{1}{n} \sum_{i=1}^{n} 24 + \frac{54}{n^2} \sum_{i=1}^{n} i + \frac{81}{n^3} \sum_{i=1}^{n} i^2$

$A = \lim_{n\to\infty} \frac{1}{n}(24n) + \frac{54}{n^2}(\frac{n(n+1)}{2}) + \frac{81}{n^3}(\frac{n(n+1)(2n+1)}{6})$

$A = \lim_{n\to\infty} \frac{24n}{n} + \frac{54}{2}(\frac{n}{n}(\frac{n}{n} + \frac{1}{n})) + \frac{81}{6}(\frac{n}{n}(\frac{n}{n} + \frac{1}{n})(\frac{2n}{n} + \frac{1}{n}))$

$A = \lim_{n\to\infty} 24 + \frac{54}{2}(1(1+0)) + \frac{81}{6}(1(1+0)(2+0))$

$A = 24 + \frac{54}{2} + \frac{162}{6}$

$A = 24 + 27 + 27$

$A = 78\ u^2$

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