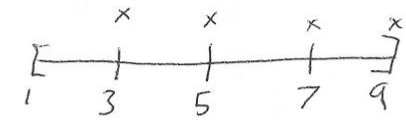
Name____

Quiz 1

1) Find an approximation to the integral $\int_1^9 (x^3+2x-1)dx$ using a Riemann sum with right endpoints and n = 4.

$$\Delta x = \frac{b-a}{n} = \frac{8}{4} = 2$$



don't need $x_i = 1 + i\Delta x$

$$\int_1^9 (x^3+2x-1)dx \approx 2\left(f(3)+f(5)+f(7)+f(9)\right)$$

2) Evaluate the integral $\int_0^2 (y-1)(1+2y)dy$ using the Fundamental Theorem of Calculus.

$$\int_0^2 (y-1)(1+2y)dy = \int_0^2 (y+2y^2-1-2y)dy$$

$$= \int_0^2 2y^2-y-1\,dy = \left.\frac{2y^3}{3} - \frac{y^2}{2} - y\,\right]_0^2 = \frac{16}{3} - 2 - 2$$

3) Evaluate the integral $\int_2^5 (4-2x)dx$ using the definition of the integral.

$$\Delta x = \frac{5-2}{n} = \frac{3}{n}$$

$$x_i = 2 + \frac{3i}{n}$$

$$a + i\Delta x$$

$$(4 - 4 - \frac{6i}{n})$$

$$\int_2^5 (4-2x)dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x = \lim_{n\to\infty} \sum_{i=1}^{n} \left(4 - 2\left(2+\frac{3i}{n}\right)\right)\frac{3}{n}$$

$$= \lim_{n\to\infty} \sum_{i=1}^{n} -\frac{18i}{n^2} = \lim_{n\to\infty} \frac{-18}{n^2}\cdot\frac{n(n+1)}{2} = \lim_{n\to\infty} -9\left(1+\frac{1}{n}\right)$$

$$= -9$$