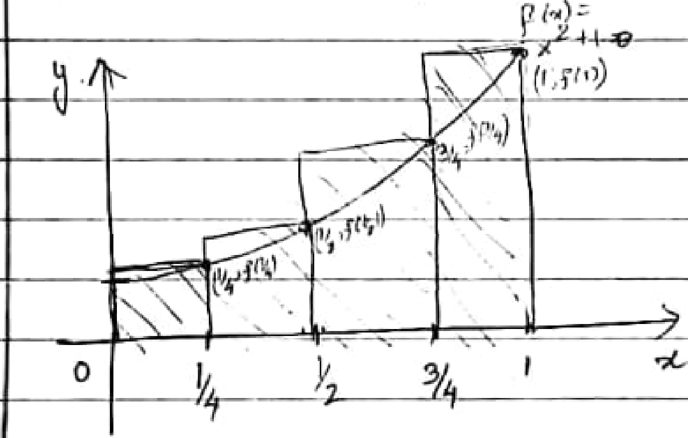
Example: Use a Riemann Sum with four subintervals ($n=4$) to approximate the area under the curve $f(x) = x^2 + 1$ over the interval $[0, 1]$. Choose the representative points to be the right-end points of the subintervals.

Soln:



$n = 4$, $b = 1$, $a = 0$

$\Delta = \dfrac{b-a}{n}$

$= \dfrac{1-0}{4} = \dfrac{1}{4}$.

$x_1 = 0 + 1/4$

$x_2 = 0 + 2 \cdot \frac{1}{4} = \frac{1}{2}$

$x_3 = 0 + 3 \cdot 1/4 = 3/4$

The approximate area is

$\frac{1}{4} \cdot f(1/4) + f(1/2) \cdot 1/4 + f(3/4) \cdot 1/4 + f(1) \cdot 1/4$

$= \frac{1}{4}\left(\frac{1}{16}+1\right) + \frac{1}{4}\left(\frac{1}{4}+1\right) + \frac{1}{4}\left(\frac{9}{16}+1\right) + \frac{1}{4}\left(1+1\right) \approx 1.4$

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