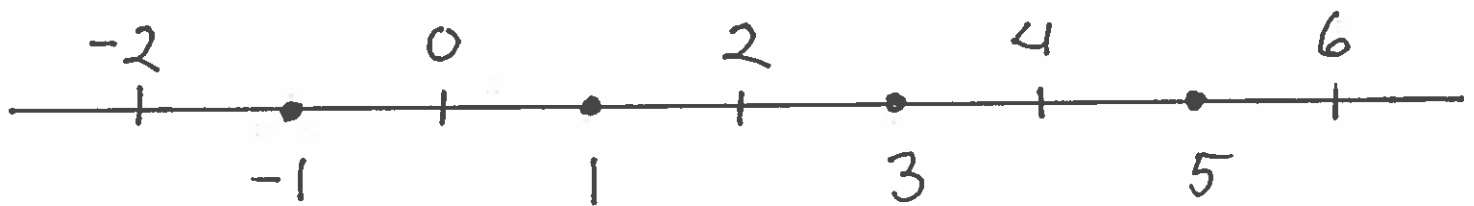


Example: Find M_4 , the Midpoint Estimate with $n=4$, for $\int_{-2}^6 \frac{1}{x^2+1} dx$.



$$h = \frac{6 - (-2)}{4} = 2 \text{ and } f(x) = \frac{1}{x^2+1}$$

$$M_4 = h [f(-1) + f(1) + f(3) + f(5)]$$

$$= 2 \left[\frac{1}{(-1)^2+1} + \frac{1}{(1)^2+1} + \frac{1}{(3)^2+1} + \frac{1}{(5)^2+1} \right]$$

$$= 2 \left[\frac{1}{2} + \frac{1}{2} + \frac{1}{10} + \frac{1}{26} \right]$$

$$\approx 2.2769$$

Exact Value (Calculator) :

$$\int_{-2}^6 \frac{1}{x^2+1} dx \approx 2.512796367$$

Absolute % Error :

$$\frac{|2.2769 - 2.512796367|}{2.512796367}$$

$$2.512796367$$

$$\approx 0.0939$$

$$= 9.39\%$$