

1-4 QUIZ

Extrema and Average Rates of Change

Average Rate of Change The average rate of change between any two points on the graph of f is the slope of the line through those points.

$$m_{sec} = \frac{f(b) - f(a)}{b - a}$$

Example: Find the average rate of change of $f(x) = 0.5x^3 + 2x$ on each interval.

a. $[-3, -1]$

$$\frac{f(b) - f(a)}{b - a} = \frac{f(-1) - f(-3)}{-1 - (-3)}$$

Substitute -3 for x_1 and -1 for x_2 .

$$= \frac{[0.5(-1)^3 + 2(-1)] - [0.5(-3)^3 + 2(-3)]}{-1 - (-3)}$$

Evaluate $f(-1)$ and $f(-3)$.

$$= \frac{-2.5 - (-19.5)}{-1 - (-3)} \text{ or } \frac{-17}{2}$$

Simplify.

Exercises

Find the average rate of change of each function on the given interval.

1. $f(x) = x^4 + 2x^3 - x - 1; [-3, -2]$

2. $f(x) = x^4 + 2x^3 - x - 1; [-1, 0]$

3. $f(x) = x^3 + 5x^2 - 7x - 4; [-3, -1]$

4. $f(x) = x^3 + 5x^2 - 7x - 4; [1, 3]$

5. $f(x) = x^4 + 8x - 3; [-4, 0]$

6. $f(x) = -x^4 + 8x - 3; [0, 1]$