

# Average Rate of Change

To calculate the rate of change of a function over the interval from  $a$  to  $b$ , evaluate the expression

$$\frac{f(b) - f(a)}{b - a}$$

Examples: Calculate the average rate of change of the function on the given interval.

1.  $y = -2x^2 + 3$ ,  $0 \leq x \leq 2$

$$a = 0$$

$$b = 2$$

$$f(a) = -2(0)^2 + 3 = 3$$

$$f(b) = -2(2)^2 + 3 = -8 + 3 = -5$$

$$\frac{\boxed{-5} - \boxed{3}}{\boxed{2} - \boxed{0}} = \frac{-8}{2} = \boxed{-4}$$

2.  $y = -(x+4)(x-1)$ ,  $-6 \leq x \leq -4$

$$a = -6$$

$$b = -4$$

$$f(a) = -(-6+4)(-6-1) = -(-2)(-7) = -14$$

$$f(b) = -(-4+4)(-4-1) = -(0)(-5) = 0$$

$$\frac{\boxed{0} - \boxed{-14}}{\boxed{-4} - \boxed{-6}} = \frac{14}{2} = \boxed{7}$$

3.  $y = 2(x+2)^2 - 3$ ,  $0 \leq x \leq 4$

$$a = 0$$

$$b = 4$$

$$f(a) = 2(0+2)^2 - 3 = 2(4) - 3 = 8 - 3 = 5$$

$$f(b) = 2(4+2)^2 - 3 = 2(36) - 3 = 72 - 3 = 69$$

$$\frac{\boxed{69} - \boxed{5}}{\boxed{4} - \boxed{0}} = \frac{64}{4} = \boxed{16}$$