

Calculus Practice: Average Value of a Function 3b

For each problem, find the average value of the function over the given interval.

1) $f(x), f(x) = \begin{cases} -2x - 4, & x \leq -2 \\ -x - 2, & x > -2 \end{cases}; [-3, -1]$

2) $f(x), f(x) = \begin{cases} \frac{x}{2} - \frac{1}{2}, & x \leq 3 \\ 1, & x > 3 \end{cases}; [-2, 7]$

3) $f(x), f(x) = \begin{cases} -\frac{x}{2} - 1, & x < 0 \\ -2x - 1, & x \geq 0 \end{cases}; [-1, 3]$

4) $f(x), f(x) = \begin{cases} -x + 1, & x \leq 2 \\ x - 3, & x > 2 \end{cases}; [1, 4]$

5) $f(x), f(x) = \begin{cases} -2x + 9, & x \leq 3 \\ 3, & x > 3 \end{cases}; [2, 5]$

6) $f(x) = -3x + |-2x + 2|; [-1, 3]$

7) $f(x) = 2x + |3x + 9|; [-7, -2]$

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

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

10) $f(x) = -2x + |-x|; [-2, 6]$

$$11) f(x), f(x) = \begin{cases} x^2 + 4x + 4, & x \leq -2 \\ -x - 2, & x > -2 \end{cases}; [-3, 0]$$

$$12) f(x), f(x) = \begin{cases} -x^2 - 2x - 1, & x < -2 \\ x + 1, & x \geq -2 \end{cases}; [-3, 1]$$

$$13) f(x), f(x) = \begin{cases} x^2 + 6x + 10, & x < -1 \\ 5, & x \geq -1 \end{cases}; [-5, 0]$$

$$14) f(x), f(x) = \begin{cases} x - 3, & x < 3 \\ x^2 - 6x + 9, & x \geq 3 \end{cases}; [-2, 4]$$

$$15) f(x), f(x) = \begin{cases} \frac{x}{2} - \frac{1}{2}, & x \leq 3 \\ -x^2 + 6x - 8, & x > 3 \end{cases}; [-2, 5]$$

$$16) f(x) = |x^2 - 5x|; [-1, 6]$$

$$17) f(x) = -|x^2 + 4x|; [-5, 1]$$

$$18) f(x) = -|x^2 - x|; [-1, 3]$$

$$19) f(x) = -|x^2 - 2x|; [-1, 3]$$

$$20) f(x) = |x^2 + 4x|; [-5, 1]$$

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For each problem, find the average value of the function over the given interval.

$$1) f(x), f(x) = \begin{cases} -2x - 4, & x \leq -2 \\ -x - 2, & x > -2 \end{cases}; [-3, -1]$$

$$\frac{1}{4} = 0.25$$

$$2) f(x), f(x) = \begin{cases} \frac{x}{2} - \frac{1}{2}, & x \leq 3 \\ 1, & x > 3 \end{cases}; [-2, 7]$$

$$\frac{11}{36} \approx 0.306$$

$$3) f(x), f(x) = \begin{cases} -\frac{x}{2} - 1, & x < 0 \\ -2x - 1, & x \geq 0 \end{cases}; [-1, 3]$$

$$-\frac{51}{16} \approx -3.188$$

$$4) f(x), f(x) = \begin{cases} -x + 1, & x \leq 2 \\ x - 3, & x > 2 \end{cases}; [1, 4]$$

$$-\frac{1}{6} \approx -0.167$$

$$5) f(x), f(x) = \begin{cases} -2x + 9, & x \leq 3 \\ 3, & x > 3 \end{cases}; [2, 5]$$

$$\frac{10}{3} \approx 3.333$$

$$6) f(x) = -3x + |-2x + 2|; [-1, 3]$$

$$-1$$

$$7) f(x) = 2x + |3x + 9|; [-7, -2]$$

$$-\frac{39}{10} = -3.9$$

$$8) f(x) = 3x + |-x + 1|; [-4, 2]$$

$$-\frac{5}{6} \approx -0.833$$

$$9) f(x) = -2x + |x - 3|; [1, 4]$$

$$-\frac{25}{6} \approx -4.167$$

$$10) f(x) = -2x + |-x|; [-2, 6]$$

$$-\frac{3}{2} = -1.5$$

$$11) f(x), f(x) = \begin{cases} x^2 + 4x + 4, & x \leq -2 \\ -x - 2, & x > -2 \end{cases}; [-3, 0]$$

$$-\frac{5}{9} \approx -0.556$$

$$12) f(x), f(x) = \begin{cases} -x^2 - 2x - 1, & x < -2 \\ x + 1, & x \geq -2 \end{cases}; [-3, 1]$$

$$-\frac{5}{24} \approx -0.208$$

$$13) f(x), f(x) = \begin{cases} x^2 + 6x + 10, & x < -1 \\ 5, & x \geq -1 \end{cases}; [-5, 0]$$

$$\frac{43}{15} \approx 2.867$$

$$14) f(x), f(x) = \begin{cases} x - 3, & x < 3 \\ x^2 - 6x + 9, & x \geq 3 \end{cases}; [-2, 4]$$

$$-\frac{73}{36} \approx -2.028$$

$$15) f(x), f(x) = \begin{cases} \frac{x}{2} - \frac{1}{2}, & x \leq 3 \\ -x^2 + 6x - 8, & x > 3 \end{cases}; [-2, 5]$$

$$-\frac{23}{84} \approx -0.274$$

$$16) f(x) = |x^2 - 5x|; [-1, 6]$$

$$\frac{53}{14} \approx 3.786$$

$$17) f(x) = -|x^2 + 4x|; [-5, 1]$$

$$-\frac{23}{9} \approx -2.556$$

$$18) f(x) = -|x^2 - x|; [-1, 3]$$

$$-\frac{17}{12} \approx -1.417$$

$$19) f(x) = -|x^2 - 2x|; [-1, 3]$$

$$-1$$

$$20) f(x) = |x^2 + 4x|; [-5, 1]$$

$$\frac{23}{9} \approx 2.556$$