

Name _____ Score _____ Teacher _____ Date _____

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

$$[a, b] = [-5 \quad , \quad -1 \quad]$$
$$[a, b] = [1, 5]$$

Math Sheet

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Mean Value Theorem

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

5. Find every c in (a, b) with $f'(c)$ equal to the secant slope.

$$f(x) = -2 \cdot x^2 + 8 \cdot x^1 - 10$$

$$[a, b] = [1, 5]$$

6. Find every c in (a, b) with $f'(c)$ equal to the secant slope.

$$f(x) = x^3 - 6 \cdot x^2 + 12 \cdot x^1 - 11$$

$$[a, b] = [-6, 2]$$

7. Find every c in (a, b) with $f'(c)$ equal to the secant slope.

$$f(x) = -2 \cdot x^2 + 8 \cdot x^1 - 6$$

$$[a, b] = [-6, 2]$$

8. Find every c in (a, b) with $f'(c)$ equal to the secant slope.

$$f(x) = x^3 - 3 \cdot x^2 + 4 \cdot x^1 + 2$$

$$[a, b] = [-2, 6]$$

Math Sheet

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Mean Value Theorem

Worked Answer Key

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

1. Endpoint values, secant slope, and derivative equation

$$f(x) = x^2 + 4 \cdot x^1 + 4$$

$$f'(x) = 2 \cdot x^1 + 4$$

$$f(a) = 1$$

$$f(b) = 36$$

$$m = 7$$

$$f'(x) - m = 2 \cdot x^1 - 3 = 0$$

$$c = \frac{3}{2}$$

2. Endpoint values, secant slope, and derivative equation

$$f(x) = x^3 - 6 \cdot x^2 + 9 \cdot x^1$$

$$f'(x) = 3 \cdot x^2 - 12 \cdot x^1 + 9$$

$$f(a) = -320$$

$$f(b) = -16$$

$$m = 76$$

$$f'(x) - m = 3 \cdot x^2 - 12 \cdot x^1 - 67 = 0$$

$$c = -\frac{1}{3}\sqrt{237} + 2$$

$$\text{Reject } c = \frac{1}{3}\sqrt{237} + 2 : \text{outside } (a, b).$$

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Mean Value Theorem

Worked Answer Key

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

3. Endpoint values, secant slope, and derivative equation

$$f(x) = -x^2 - 4x^1 - 3$$

$$f'(x) = -2x^1 - 4$$

$$f(a) = -8$$

$$m = 2$$

$$f'(x) - m = -2x^1 - 6 = 0$$

$$c = -3$$

$$f(b) = 0$$

4. Endpoint values, secant slope, and derivative equation

$$f(x) = -x^3 + 2x^1 + 4$$

$$f'(x) = -3x^2 + 2$$

$$f(a) = 5$$

$$m = -29$$

$$f'(x) - m = -3x^2 + 31 = 0$$

$$c = \frac{1}{3}\sqrt{93}$$

$$\text{Reject } c = \frac{-1}{3}\sqrt{93} : \text{outside } (a, b).$$

$$f(b) = -111$$

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Mean Value Theorem

Worked Answer Key

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

5. Endpoint values, secant slope, and derivative equation

$$f(x) = -2 \cdot x^2 + 8 \cdot x^1 - 10$$

$$f'(x) = -4 \cdot x^1 + 8$$

$$f(a) = -4$$

$$m = -4$$

$$f'(x) - m = -4 \cdot x^1 + 12 = 0$$

$$c = 3$$

$$f(b) = -20$$

6. Endpoint values, secant slope, and derivative equation

$$f(x) = x^3 - 6 \cdot x^2 + 12 \cdot x^1 - 11$$

$$f'(x) = 3 \cdot x^2 - 12 \cdot x^1 + 12$$

$$f(a) = -515$$

$$m = 64$$

$$f'(x) - m = 3 \cdot x^2 - 12 \cdot x^1 - 52 = 0$$

$$c = -\frac{8}{3}\sqrt{3} + 2$$

$$\text{Reject } c = \frac{8}{3}\sqrt{3} + 2 : \text{outside } (a, b).$$

$$f(b) = -3$$

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Mean Value Theorem

Worked Answer Key

For each function on $[a, b]$, find every c in (a, b) such that $f'(c) = (f(b) - f(a))/(b - a)$. Show the endpoint values, secant slope, and derivative equation.

7. Endpoint values, secant slope, and derivative equation

$$f(x) = -2 \cdot x^2 + 8 \cdot x^1 - 6$$

$$f'(x) = -4 \cdot x^1 + 8$$

$$f(a) = -126$$

$$f(b) = 2$$

$$m = 16$$

$$f'(x) - m = -4 \cdot x^1 - 8 = 0$$

$$c = -2$$

8. Endpoint values, secant slope, and derivative equation

$$f(x) = x^3 - 3 \cdot x^2 + 4 \cdot x^1 + 2$$

$$f'(x) = 3 \cdot x^2 - 6 \cdot x^1 + 4$$

$$f(a) = -26$$

$$f(b) = 134$$

$$m = 20$$

$$f'(x) - m = 3 \cdot x^2 - 6 \cdot x^1 - 16 = 0$$

$$c = -\frac{1}{3}\sqrt{57} + 1, \frac{1}{3}\sqrt{57} + 1$$