The Mean Value Theorem

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the value or values of c that satisfy the equation $\frac{f(b) - f(a)}{b - a} = f'(c)$ in the conclusion of the Mean Value Theorem for the function and interval.

1) $f(x) = x^2 + 3x + 1, \ [-1, 2]$ 1) _____

A) $-1, 2$ B) $\frac{1}{2}$ C) $0, \frac{1}{2}$ D) $-\frac{1}{2}, \frac{1}{2}$

2) $f(x) = x + \frac{12}{x}, \ [3, 4]$ 2) _____

A) $0, 2\sqrt{3}$ B) $2\sqrt{3}$ C) $3, 4$ D) $-2\sqrt{3}, 2\sqrt{3}$

3) $f(x) = \ln(x - 1), [2, 4]$ Round to the nearest thousandth. 3) _____

A) 2.820 B) 3.820 C) 3.885 D) ±2.820

4) $f(x) = x^2 + 3x + 4, \ [1, 2]$ 4) _____

A) $1, 2$ B) $-\frac{3}{2}, \frac{3}{2}$ C) $\frac{3}{2}$ D) $0, \frac{3}{2}$

5) $f(x) = x + \frac{18}{x}, \ [2, 9]$ 5) _____

A) $-3\sqrt{2}, 3\sqrt{2}$ B) $2, 9$ C) $0, 3\sqrt{2}$ D) $3\sqrt{2}$

6) $f(x) = \ln(x - 1), [2, 5]$ Round to the nearest thousandth. 6) _____

A) 4.164 B) 3.164 C) ±3.164 D) 3.731

7) $f(x) = x^2 + 2x + 4, \ [1, 2]$ 7) _____

A) $1, 2$ B) $\frac{3}{2}$ C) $0, \frac{3}{2}$ D) $-\frac{3}{2}, \frac{3}{2}$

8) $f(x) = x^2 + 5x + 4, \ [-3, 2]$ 8) _____

A) $0, -\frac{1}{2}$ B) $-\frac{1}{2}, \frac{1}{2}$ C) $-\frac{1}{2}$ D) $-3, 2$

9) $f(x) = \ln(x - 4), [5, 9]$ Round to the nearest thousandth. 9) _____

A) 6.885 B) 6.485 C) 7.485 D) ±6.485

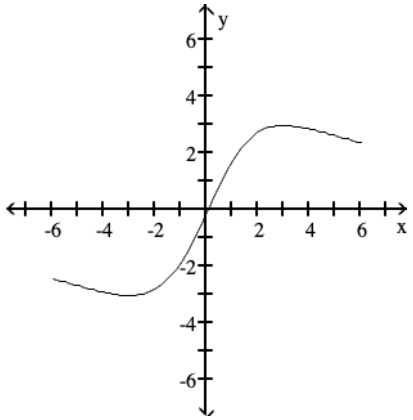
10) $f(x) = \tan^{-1} x, [-1, 1]$ Round to the nearest thousandth. 10) _____

A) 0.523 B) ±0.523

C) 0, 0.523 D) −0.523, 0, 0.523

Find the open intervals on which the function is increasing and decreasing. Identify the function's local and absolute extreme values, if any, saying where they occur.

11) 11) _____



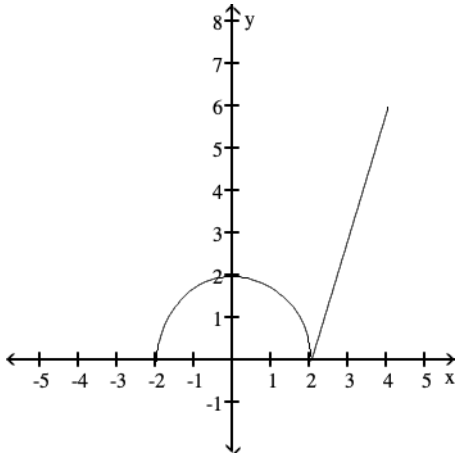
A) increasing on (–3, 3); decreasing on (–6, 0);
absolute maximum at (3, 3); absolute minimum at (–3, –3)

B) increasing on (–3, 3); decreasing on (–6, –3) and (3, 6);
absolute maximum at (3, 3); absolute minimum at (–3, –3)

C) increasing on (–3, 3); decreasing on (0, 6);
absolute maximum at (3, 3); absolute minimum at (–3, –3)

D) increasing on (–3, 3); decreasing on (–6, –3) and (3, 6);
no absolute maximum; no absolute minimum

12) 12) _____



A) increasing on (–2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 6); local maximum at (0, 2); absolute minimum at (–2, 0) and (2, 0)

B) increasing on (–2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 6); absolute minimum at (–2, 0) and (2, 0)

C) increasing on (2, 4); decreasing on (0, 2);
absolute maximum at (4, 6); local maximum at (0, 2); absolute minimum at (–2, 0) and (2, 0)

D) increasing on (–2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 6) and(0,2); absolute minimum at (–2, 0) and (2, 0)

Answer Key
Testname: THE MEAN VALUE THEOREM

1) B
2) B
3) A
4) C
5) D
6) B
7) B
8) C
9) B
10) B
11) B
12) A