Calculus Practice: Mean Value Theorem 2a

For each problem, determine if Rolle's Theorem can be applied. If it can, find all values of *c* that satisfy the theorem. If it cannot, explain why not.

1) $y = x^2 + 2$; $[-2, 2]$

A) $\left\{\frac{1}{2}\right\}$ B) $\left\{-\frac{1}{2}\right\}$

C) $\{0\}$ D) $\{-1\}$

2) $y = -x^2 + 4x - 4$; $[0, 4]$

A) $\{1\}$ B) $\left\{\frac{5}{2}\right\}$

C) $\left\{\frac{3}{2}\right\}$ D) $\{2\}$

3) $y = -2x^2 - 16x - 33$; $[-5, -3]$

A) $\{-4\}$ B) $\left\{-\frac{7}{2}\right\}$

C) $\{-5\}$ D) $\left\{-\frac{9}{2}\right\}$

4) $y = -2x^2 + 12x - 19$; $[2, 4]$

A) $\{2\}$ B) $\{3\}$

C) $\left\{\frac{5}{2}\right\}$ D) $\left\{\frac{7}{2}\right\}$

5) $y = -x^3 + 2x^2 + x + 2$; $[-1, 2]$

A) $\left\{-\frac{2}{3}\right\}$

B) $\left\{0, \frac{4}{3}\right\}$

C) $\left\{\frac{2 - \sqrt{13}}{3}, \frac{2 + \sqrt{13}}{3}\right\}$

D) $\left\{\frac{2 - \sqrt{7}}{3}, \frac{2 + \sqrt{7}}{3}\right\}$

6) $y = x^3 - 2x^2 - x + 1$; $[-1, 2]$

A) $\left\{-\frac{2}{3}\right\}$

B) $\left\{\frac{2 + \sqrt{7}}{3}, \frac{2 - \sqrt{7}}{3}\right\}$

C) $\left\{\frac{2 + \sqrt{13}}{3}, \frac{2 - \sqrt{13}}{3}\right\}$

D) $\left\{\frac{2 - \sqrt{19}}{3}\right\}$

7) $y = -x^3 + x^2 + 4x - 5$; $[-2, 2]$

A) $\left\{\frac{1 - 2\sqrt{7}}{3}\right\}$

B) $\left\{\frac{1 - \sqrt{13}}{3}, \frac{1 + \sqrt{13}}{3}\right\}$

C) $\left\{-\frac{4}{3}\right\}$

D) $\left\{1, -\frac{1}{3}\right\}$

8) $y = x^3 - 3x^2 - x + 7$; $[-1, 3]$

A) $\left\{\frac{3 + \sqrt{21}}{3}, \frac{3 - \sqrt{21}}{3}\right\}$

B) $\left\{\frac{3 + 2\sqrt{3}}{3}, \frac{3 - 2\sqrt{3}}{3}\right\}$

C) $\left\{\frac{3 + \sqrt{3}}{3}, \frac{3 - \sqrt{3}}{3}\right\}$

D) $\{0, 2\}$

9) $y = \frac{x^2 - 36}{-x + 7}$; $[-6, 6]$

A) The function is not differentiable on $(-6, 6)$

B) $\{7 - 2\sqrt{3}\}$

C) The function is not continuous on $[-6, 6]$

D) $\{7 - \sqrt{13}\}$

10) $y = \dfrac{-x^2 + 1}{4x}$; $[-1, 1]$

A) The function is not differentiable on $(-1, 1)$
B) $\{-1\}$
C) The function is not continuous on $[-1, 1]$
D) $\{0\}$

11) $y = \dfrac{-x^2 + 4}{3x}$; $[-2, 2]$

A) $\{0\}$
B) $\{-1\}$
C) The function is not continuous on $[-2, 2]$
D) The function is not differentiable on $(-2, 2)$

12) $y = \dfrac{x^2 - x - 6}{-x + 4}$; $[-2, 3]$

A) The function is not continuous on $[-2, 3]$
B) $\{4 - 2\sqrt{3}\}$
C) $\{4 - \sqrt{6}\}$
D) The function is not differentiable on $(-2, 3)$

13) $y = -2\cos(x)$; $[-\pi, \pi]$

A) The function is not differentiable on $(-\pi, \pi)$
B) $\{0\}$
C) $\left\{-\dfrac{\pi}{2}, \dfrac{\pi}{2}, 0\right\}$
D) The function is not continuous on $[-\pi, \pi]$

14) $y = -\sin(2x)$; $[-\pi, \pi]$

A) The function is not differentiable on $(-\pi, \pi)$
B) The function is not continuous on $[-\pi, \pi]$
C) $\left\{-\dfrac{3\pi}{4}, -\dfrac{\pi}{4}, \dfrac{\pi}{4}, \dfrac{3\pi}{4}\right\}$
D) $\{0\}$

15) $y = \tan(x)$; $[-\pi, \pi]$

A) The function is not continuous on $[-\pi, \pi]$
B) The function is not differentiable on $(-\pi, \pi)$
C) $\{0\}$
D) $\left\{-\dfrac{3\pi}{4}, -\dfrac{\pi}{4}, \dfrac{\pi}{4}, \dfrac{3\pi}{4}, 0\right\}$

16) $y = -2\sec(x)$; $[-\pi, \pi]$

A) $\{0\}$
B) The function is not continuous on $[-\pi, \pi]$
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