Calculus Practice: Mean Value Theorem 2b

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) $y = x^2 - 6x + 11;\ \ [1, 5]$

2) $y = -\frac{x^2}{2} + 2x - 2;\ \ [0, 4]$

3) $y = -\frac{x^2}{2} + x - \frac{1}{2};\ \ [0, 2]$

4) $y = -x^2 - 8x - 11;\ \ [-7, -1]$

5) $y = -2x^2 - 16x - 32;\ \ [-5, -3]$

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

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

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

9) $y = x^3 - x^2 - 4x - 1;\ \ [-2, 2]$

10) $y = -x^3 + 4x^2 + x - 6;\ \ [-1, 4]$

11) $y = \dfrac{x^2 + 3x - 18}{x + 7}$; $[-6, 3]$

12) $y = \dfrac{-x^2 - 3x + 10}{-x + 3}$; $[-5, 2]$

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

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

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

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

17) $y = -2\tan(2x)$; $[-\pi, \pi]$

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

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

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

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

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

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

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

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

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

9) $y = x^3 - x^2 - 4x - 1;\ \ [-2, 2]$

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

10) $y = -x^3 + 4x^2 + x - 6;\ \ [-1, 4]$

$\left\{\frac{4 - \sqrt{19}}{3}, \frac{4 + \sqrt{19}}{3}\right\}$

11) $y = \dfrac{x^2 + 3x - 18}{x + 7}$; $[-6, 3]$

$\{-7 + \sqrt{10}\}$

12) $y = \dfrac{-x^2 - 3x + 10}{-x + 3}$; $[-5, 2]$

$\{3 - 2\sqrt{2}\}$

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

The function is not continuous on $[-2, 2]$

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

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

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

$\left\{-\dfrac{\pi}{2}, 0, \dfrac{\pi}{2}\right\}$

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

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$\{0\}$

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

$\left\{-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right\}$