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تکلیف ۹

دوم دضرائی

عملی و مفاتی

الف) $y = x^2 - 5 \Rightarrow x^2 = y + 5 \Rightarrow x = \pm \sqrt{y + 5} \Rightarrow y \geq -5 \Rightarrow R_f = [-5, +\infty)$ (۲)

ب) $y = x^3 + 1 \Rightarrow x^3 = y - 1 \Rightarrow x = \sqrt[3]{y - 1} \Rightarrow R_f = \mathbb{R}$

الف) $y = x^2 - 4 \Rightarrow x^2 = y + 4 \Rightarrow x = \pm \sqrt{y + 4} \Rightarrow y \geq -4 \Rightarrow R_f = [-4, +\infty)$ (۳)

ب) $y = x^2 - 5x + 1 \Rightarrow x^2 - 5x + 1 - y = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 25 - 4(1 - y) \geq 0 \Rightarrow 25 - 4 + 4y \geq 0 \Rightarrow 21 + 4y \geq 0 \Rightarrow y \geq -\frac{21}{4} \Rightarrow R_f = [-\frac{21}{4}, +\infty)$

الف) $y = \frac{x^2 + 2}{x^2 - 2} \Rightarrow x^2 y = x^2 + 2 \Rightarrow x^2 y - x^2 = 2 \Rightarrow x^2(y - 1) = 2 \Rightarrow x^2 = \frac{2}{y - 1} \Rightarrow x = \pm \sqrt{\frac{2}{y - 1}} \Rightarrow y > 1 \Rightarrow R_f = (1, +\infty)$ (۲)

ب) $y = \frac{2x + 1}{x^2 - 2} \Rightarrow x^2 y = 2x + 1 \Rightarrow x^2 y - 2x - 1 = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 4 - 4(y - 1) \geq 0 \Rightarrow 4 - 4y + 4 \geq 0 \Rightarrow 8 - 4y \geq 0 \Rightarrow y \leq 2 \Rightarrow R_f = (-\infty, 2]$

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ب) $y = \frac{1}{x^2 - 2} \Rightarrow x^2 y = 1 \Rightarrow x^2 = \frac{1}{y} \Rightarrow x = \pm \sqrt{\frac{1}{y}} \Rightarrow y > 0 \Rightarrow R_f = (0, +\infty)$ (۳)

الف) $y = x^2 - 4x + 2 \Rightarrow x^2 - 4x + 2 - y = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 16 - 4(2 - y) \geq 0 \Rightarrow 16 - 8 + 4y \geq 0 \Rightarrow 8 + 4y \geq 0 \Rightarrow y \geq -2 \Rightarrow R_f = [-2, +\infty)$

ب) $y = -x^2 + 4x + 10 \Rightarrow x^2 - 4x - 10 - y = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 16 - 4(-10 - y) \geq 0 \Rightarrow 16 + 40 + 4y \geq 0 \Rightarrow 56 + 4y \geq 0 \Rightarrow y \geq -14 \Rightarrow R_f = [-14, +\infty)$ (۴)

الف) $y = x^2 + 2x + 1 \Rightarrow x^2 + 2x + 1 - y = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 4 - 4(1 - y) \geq 0 \Rightarrow 4 - 4 + 4y \geq 0 \Rightarrow 4y \geq 0 \Rightarrow y \geq 0 \Rightarrow R_f = [0, +\infty)$ (۳)

ب) $y = x^2 + 2x + 1 \Rightarrow x^2 + 2x + 1 - y = 0 \Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 4 - 4(1 - y) \geq 0 \Rightarrow 4 - 4 + 4y \geq 0 \Rightarrow 4y \geq 0 \Rightarrow y \geq 0 \Rightarrow R_f = [0, +\infty)$

الف) $y = \frac{x^3 + 1}{x - 2}$ $\Rightarrow \frac{a}{c} = \frac{3}{1} \Rightarrow R_f = 1R - \{3\}$

ب) $y = \sqrt{\frac{x^4 + 1}{x + 3}}$, $\frac{a}{c} = 4 \Rightarrow R_f = 1R - \{4\}$ ~~$[0, +\infty) - 14$~~ 113

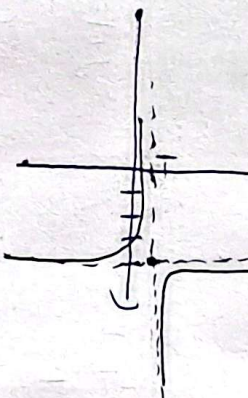
الف) $y = \frac{x^3 + 1}{x - 2}$ $\Rightarrow$ جانب قائم $= 2$ (بیشتر مزج)

$\Rightarrow$ جانب افقی $= \frac{a}{c} = 3$

$x = 0 \Rightarrow y = -\frac{1}{2}$

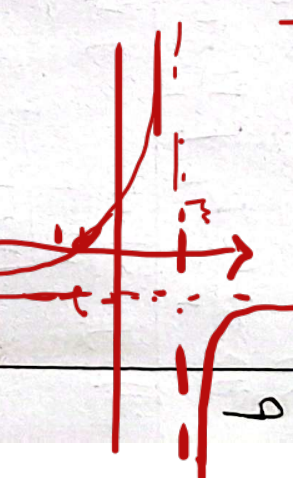
ب) $y = \frac{x^4 - 2}{x - 1}$ $\Rightarrow$ جانب قائم $= \frac{1}{1} = 1$

$\Rightarrow$ جانب افقی $= 1$



$\frac{2(2x-1)}{-(1^3x-1)} = -2$

513



الف) $y = \cos^2 x + \frac{1}{\cos^2 x} \Rightarrow \cos^2 x \geq 0 \Rightarrow R_f = [1, +\infty)$

ب) $y = \sqrt{x + \frac{1}{x}}$ $\Rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$

$x > 0 \rightarrow (\sqrt{x} + \frac{1}{\sqrt{x}})$
 $x < 0 \rightarrow (-\sqrt{x} + \frac{1}{\sqrt{x}})$

113