

سوال ۱ الف) $y = x^2 - 8 \rightarrow x^2 = y + 8 \rightarrow x = \sqrt{y+8} \rightarrow R_f = [-8, +\infty)$

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

سوال ۲ الف) $y = x^2 - 4x + 6 \rightarrow y = x^2 - 4x + 4 + 2 \Rightarrow y = (x-2)^2 + 2$
 $(x-2)^2 = y - 2 \rightarrow x = \pm \sqrt{y-2} + 2 \Rightarrow R_f = [2, +\infty)$

ب) $y = x^2 - 8x + 1 \rightarrow x^2 - 8x + (1-y) = 0$
 $\Delta = b^2 - 4ac$
 $x = \frac{8 \pm \sqrt{64 - 4(1-y)}}{2} \Rightarrow 21 + 4y \geq 0$
 $y \geq -\frac{21}{4}$

$\Rightarrow R_f = [-\frac{21}{4}, +\infty)$

$a = 1$
 $b = -8$
 $c = (1-y)$

سوال ۳ الف) $y = \frac{x^2 + 3}{x^2 - 2} \rightarrow x^2 + 3 = yx^2 - 2y \rightarrow x^2 - yx^2 = -3 - 2y$
 $\rightarrow x^2(1-y) = -3 - 2y \rightarrow x^2 = \frac{-3-2y}{1-y} \Rightarrow x = \pm \sqrt{\frac{-3-2y}{1-y}}$

$\rightarrow \frac{-\frac{3}{2}}{+\frac{1}{2} - \frac{1}{2} +} \Rightarrow R_f = (-\infty, -\frac{3}{2}] \cup (1, +\infty)$

ب) $y = \frac{2|x|+1}{|x|-4} \rightarrow 2|x|+1 = y|x|-4y \rightarrow 2|x|-y|x| = -1-4y$
 $\rightarrow |x|(2-y) = -1-4y \Rightarrow |x| = \frac{-1-4y}{2-y} \rightarrow \frac{-\frac{1}{2}}{+\frac{1}{2} - \frac{1}{2} +} \Rightarrow R_f = (-\infty, -\frac{1}{4}] \cup (2, +\infty)$

سوال ۴ $y = \frac{1}{x^2 - 4x} \rightarrow yx^2 - 4yx = 1 \rightarrow yx^2 - (4y)x - 1 = 0$

$\Delta = 16y^2 + 4y \geq 0 \Rightarrow 4y(4y+1) \geq 0$

$a = y$
 $b = -4y$
 $c = -1$

$\frac{-\frac{1}{4}}{+\frac{1}{2} - \frac{1}{2} +} \Rightarrow R_f = (-\infty, -\frac{1}{4}] \cup (0, +\infty)$

نکته: y نمی تواند منفی باشد چون اگر باشد = 0 - دربی آید که نمی توان گفت معین معاری را

سوال ۵ الف) $y = \frac{x^2 - 6x + 2}{x - 1}$ ext $\left| \frac{y}{x} = w \right| \Rightarrow R_f = [-7, +\infty)$

ب) $y = \frac{-x^2 + 4x + 2}{-x - 1}$ ext $\left| \frac{-\frac{4}{-1} = 2}{-1} \right| \Rightarrow R_f = (-\infty, +\infty)$

سوال ۶

الف) $y = \sqrt{x^2 - 4x + 4} \rightarrow \text{ext} \left| \begin{array}{c} \frac{2}{x} \\ -4 \end{array} \right|$ $R_f = \sqrt{[-4; +\infty)} \rightarrow R_f = [0; +\infty)$ ✓

ب) $y = \sqrt{-x^2 + 4x + 4} \rightarrow \text{ext} \left| \begin{array}{c} -\frac{2}{x} \\ 4 \end{array} \right|$ $R_f = \sqrt{(-\infty; +1]} \rightarrow R_f = [0; +1]$

$R_f = [0; \sqrt{14}]$

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سوال ۷

الف) $y = x^2 + 2x + 1 \Rightarrow R_f = \mathbb{R}$ ✓

ب) $\sqrt{x^2 + 4x + 4} = R_f = [0; +\infty)$ ✓ ۲

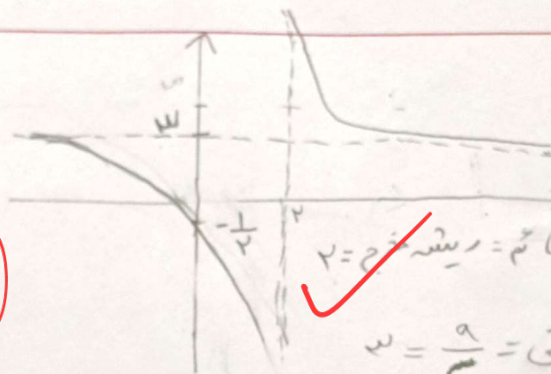
سوال ۸

الف) $y = \frac{3x+1}{x-2} \Rightarrow R_f = \mathbb{R} - \{3\}$ ✓

ب) $y = \sqrt{\frac{4x+1}{x+2}} = R_f = [0; +\infty) - \{2\}$ ✓ ۲

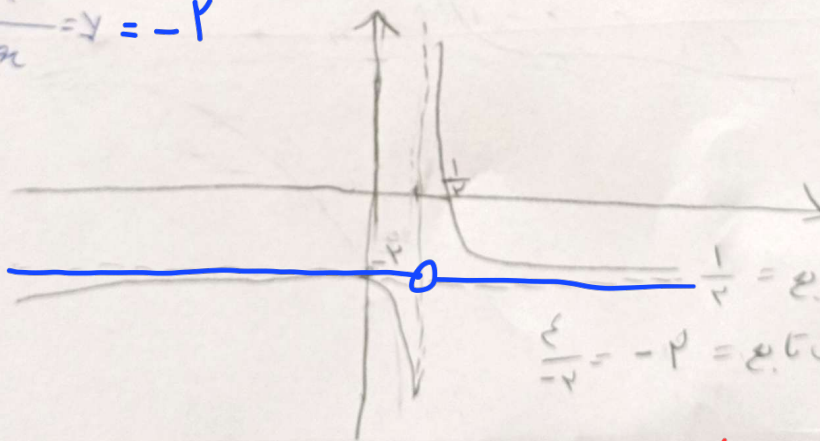
سوال ۹

الف) $y = \frac{3x+1}{x-2}$



ب) $\frac{4x-2}{1-2x} = y = -2$

$x = \frac{1}{2}$



سوال ۱۰

الف) $\cos^2 x + \frac{1}{\cos^2 x} \rightarrow R_f = [2; +\infty)$ ✓

ب) $y = \sqrt{\frac{x^2+1}{x}} \rightarrow \sqrt{x + \frac{1}{x}} \Rightarrow R_f = \sqrt{(-\infty; -2] \cup [2; +\infty)}$

$R_f = (-\infty, \sqrt{-2}] \cup [\sqrt{2}, +\infty)$

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