

۱۸، ۵

الف) $x^2 = y + 5 \rightarrow x = \pm \sqrt{y + 5} \rightarrow y + 5 \geq 0 \rightarrow y \geq -5$

$R_f \rightarrow [-5, +\infty)$

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

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الف) $y = (x + 2)^2 + 2 \rightarrow (x + 2)^2 = y - 2 \rightarrow x + 2 = \pm \sqrt{y - 2}$

$R_f = [2, +\infty)$ $y \geq 2 \rightarrow y - 2 \geq 0 \rightarrow x = \pm \sqrt{y - 2} - 2$

ارغلا
راه اصلی چیست!

ب) $x^2 - 5x + 1 - y = 0 \rightarrow x = \frac{5 \pm \sqrt{25 - 4(1 - y)}}{2} = \frac{5 \pm \sqrt{21 + 4y}}{2}$

$y = (x - \frac{5}{2})^2 - \frac{21}{4} \rightarrow x = \pm \sqrt{y + \frac{21}{4}} + \frac{5}{2} \rightarrow y + \frac{21}{4} \geq 0 \rightarrow y \geq -\frac{21}{4}$

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الف) $yx^2 - 2y = x^2 + 3 \rightarrow yx^2 - x^2 = 3 + 2y \rightarrow x^2(y - 1) = 3 + 2y$

$R_f = (-\infty, -\frac{3}{2}] \cup (1, +\infty)$ $x^2 = \frac{3 + 2y}{y - 1} \rightarrow x = \pm \sqrt{\frac{3 + 2y}{y - 1}}$

ب) $y|x| - 4y = 2|x| + 1 \rightarrow y|x| - 2|x| = 4y + 1$

$\rightarrow |x|(y - 2) = 4y + 1 \rightarrow |x| = \frac{4y + 1}{y - 2} \geq 0$

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

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$yx^2 - 4yx = 1 \rightarrow yx^2 - 4yx - 1 = 0 \rightarrow x = \frac{4y \pm \sqrt{16y^2 + 4y}}{2y}$

$\rightarrow x = \frac{4y \pm \sqrt{4y(4y + 1)}}{2y} \rightarrow 4y^2 + 4y \geq 0 \rightarrow 4y(4y + 1) \geq 0 \rightarrow \frac{-1}{4} \leq y \leq 0$
 $\rightarrow 4y \neq 0 \rightarrow y \neq 0$

ارغلا

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

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الف) $\min_{\text{دار}} \rightarrow \text{دب} = \frac{-b}{2a} \rightarrow \frac{4}{2} = 2 \rightarrow y = -4$

$R_f = [-4, +\infty)$

ب) $\max_{\text{دار}} \rightarrow \text{دب} = \frac{-b}{2a} \rightarrow \frac{-4}{-2} = 2 \rightarrow R_f = (-\infty, 2]$

عوض کلیدی = 4

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الف) $\min_{x \in \mathbb{R}} \frac{-b}{2a} = \frac{4}{2} = 2$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 0 \rightarrow R_f = [-2, +\infty)$

$\rightarrow \sqrt{[-2, +\infty)} \rightarrow R_f = [0, +\infty)$

ب) $\max_{x \in \mathbb{R}} \frac{-b}{2a} = \frac{-4}{-2} = 2$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 16 \rightarrow R_f = (-\infty, 2]$

$\rightarrow R_f = [0, 2]$ $\sqrt{16}$ $[2, \sqrt{16}]$

1, 2, 5

الف) $R_f = \mathbb{R}$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 0$ $\rightarrow R_f = \mathbb{R}$

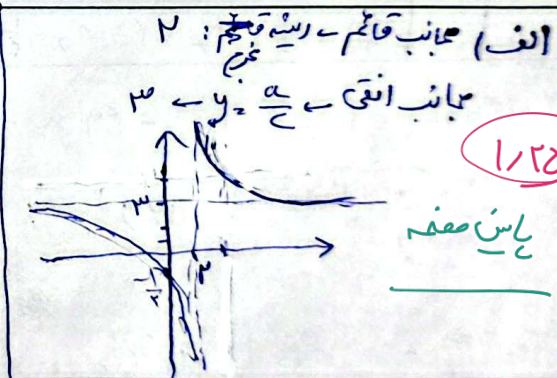
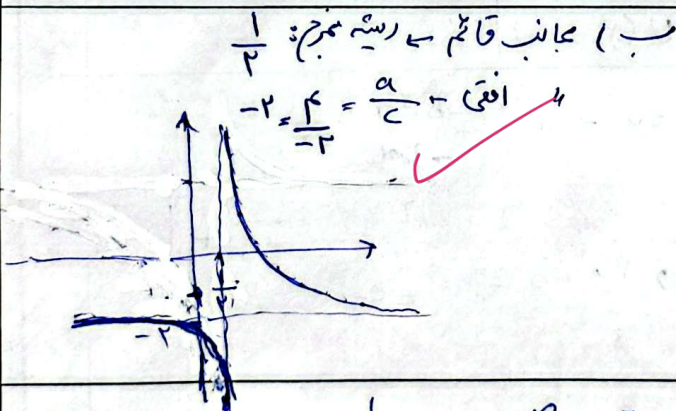
ب) $R_f = \mathbb{R}$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 0$ $\rightarrow R_f = [0, +\infty)$

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الف) $R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\}$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 0$ $\rightarrow R_f = \mathbb{R} - \{3\}$

ب) $R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\}$ $\xrightarrow{\text{ملاحظه}}$ $\Delta = 0$ $\rightarrow R_f = \mathbb{R} - \{2\}$ $\xrightarrow{\text{ملاحظه}}$ $R_f = [0, +\infty) - \{2\}$

2



1, 2, 5

الف) $\min_{x \in \mathbb{R}} a + \frac{1}{x} \rightarrow R_f = [2, +\infty)$

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

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

1, 2, 5

سوال ۹ قیمت پ

$$y = \frac{\sum u - 2}{1 - r_n} = \frac{2(r_n - 1)}{1 - r_n} = -2$$

