کلاس دهم دختر A — تکلیف ۹ — سا عسگری

۱)
الف) $x^2 = y+5$ $\quad x = \pm\sqrt{y+5}$ $\quad R_f = [-5, +\infty)$

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

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

ب) $x^2 - 5x + (1-y) = 0$ $\quad \Delta = 25 - 4 + 4y = 21 + 4y \geq 0$ $\quad 4y \geq -21$ $\quad y \geq \frac{-21}{4} = -5.25$

$R_f = [-5.25, +\infty)$

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۳)
الف) $x^2 + 3 = yx^2 - 2y$ $\quad x^2 - yx^2 = -2y - 3$ $\quad x^2(1-y) = -2y-3$ $\quad x^2 = \frac{-2y-3}{1-y}$ $\quad x^2 = \frac{-(2y+3)}{-(y-1)}$

$x = \pm\sqrt{\frac{2y+3}{y-1}}$ $\quad$ ($-\frac{3}{2}$, 1: $+ \mid - \mid$ ت.ن $+$) $\quad R_f = (-\infty, -\frac{3}{2}] \cup (1, +\infty)$

ب) $2|x| + 1 = y|x| - 4y$ $\quad 2|x| - y|x| = -4y - 1$ $\quad |x|(2-y) = -4y - 1$ $\quad |x| = \frac{-4y-1}{2-y} = \frac{4y+1}{y-2}$

$x = \pm\frac{4y+1}{y-2}$ $\quad$ ($-\frac{1}{4}$, 2: $+ \mid - \mid$ ت.ن $+$) $\quad R_f = (-\infty, -\frac{1}{4}] \cup (2, +\infty)$

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۴)
الف) $y = \frac{1}{x^2 - 4x}$ $\quad yx^2 - 4yx - 1 = 0$ $\quad \Delta = 16y^2 - 4y \geq 0$

$4y(4y+1) \geq 0$

$4y = 0$ $\quad 4y + 1 = 0$

$y = 0$ $\quad 4y = -1$

$y = -\frac{1}{4}$

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

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۵)
الف) $a > 0$ $\quad x_{min} = \frac{6}{2} = 3$ $\quad R_f = [-7, +\infty)$

$y_{min} = 9 - 18 + 2 = -7$

ب) $a < 0$ $\quad x_{max} = \frac{-4}{-2} = 2$ $\quad R_f = (-\infty, 6]$

$y_{max} = -4 + 8 + 2 = 6$

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۶)
الف) $a > 0$ $\quad x_{min} = \frac{6}{2} = 3$

$y_{min} = 9 - 18 + 2 = -7 \rightarrow [-7, +\infty) \xrightarrow{\sqrt{\ }} [0, +\infty)$ $\quad R_f = [0, +\infty)$

ب) $a < 0$ $\quad x_{max} = \frac{-4}{-2} = 2$

$y_{max} = -4 + 8 + 10 = 14 \rightarrow (-\infty, 14] \xrightarrow{\sqrt{\ }} [0, \sqrt{14}]$ $\quad R_f = [0, \sqrt{14}]$

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۷)
الف) $R_f = \mathbb{R}$ $\quad$ ب) $R_f = [0, +\infty)$

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۸)
الف) $ad \neq bc \rightarrow 6 \neq 1$ $\quad \frac{a}{c} = 3$ $\quad R_f = \mathbb{R} - \{\frac{a}{c}\}$ $\quad R_f = \mathbb{R} - \{3\}$

ب) $12 \neq 1$ $\quad \frac{a}{c} = 4$ $\quad \mathbb{R} - \{4\} \xrightarrow{\sqrt{\ }} [0, +\infty) - \{2\}$ $\quad R_f = [0, +\infty) - \{2\}$

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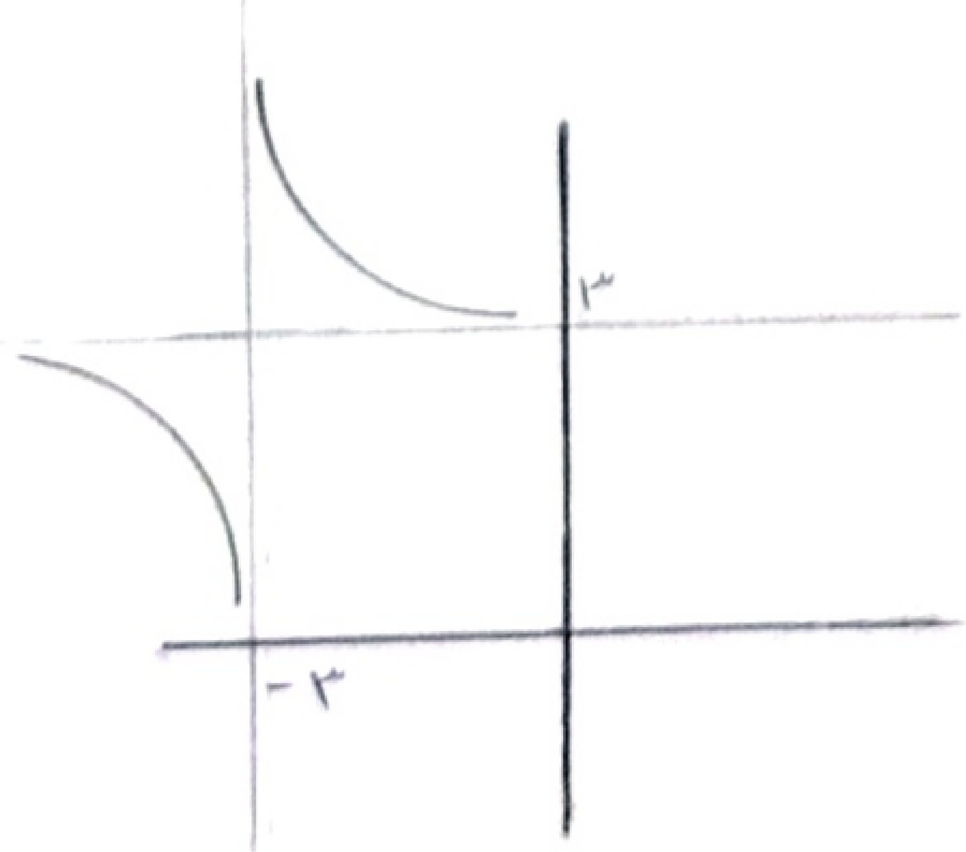
۹)
الف)



$x + 3 = 0$

$x = -3$

$y = \frac{a}{c} = 3$

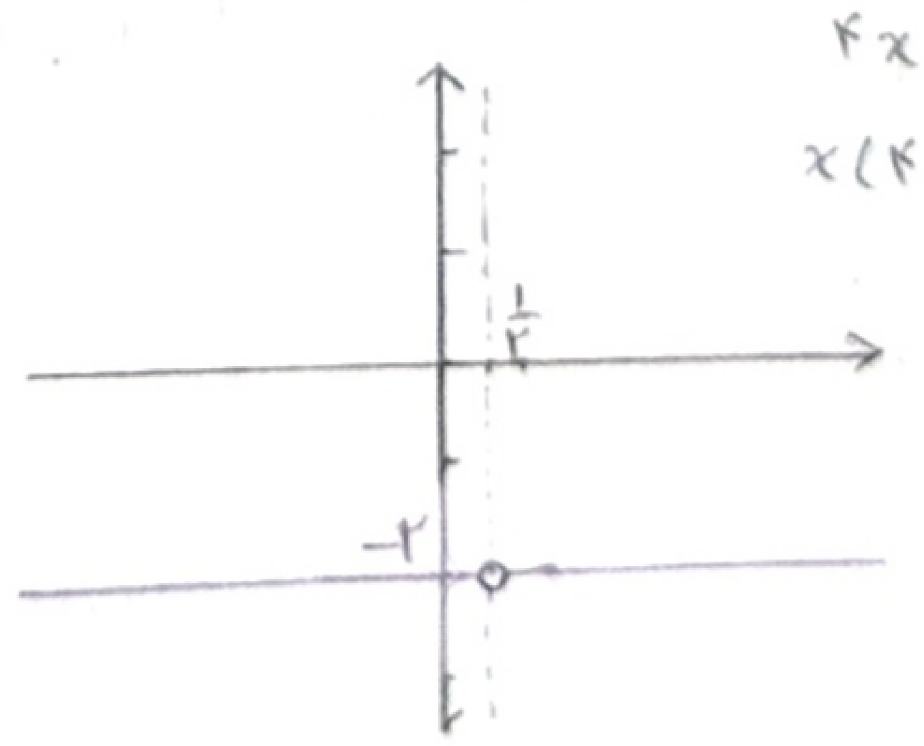
ب) $y = \frac{4x-2}{-2x+1}$ $\quad 4x - 2 = -2xy + y$

$4x + 2xy = y + 2$

$x(4 + 2y) = y + 2$ $\quad x = \frac{y+2}{2(y+2)} = \frac{1}{2}$

$\hookrightarrow y \neq -2$

$R_f = \{-2\}$



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ب) $a + \frac{1}{a}$ $a > 0$ $R_f = [2, +\infty)$

ج) $\sqrt[3]{\frac{x^2}{x} + \frac{1}{x}} = \sqrt[12]{x + \frac{1}{x}}$ $R_f = (-\infty, -2] \cup [2, +\infty)$