

الف) $y = x^2 - 5$

$x^2 = y + 5 \rightarrow x = \pm \sqrt{y+5}$

$y + 5 \geq 0 \rightarrow y \geq -5 \quad R_f \rightarrow [-5, +\infty)$

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ب) $y = x^2 + 1$

$x^2 = y - 1 \rightarrow x = \pm \sqrt{y-1} \rightarrow R_f = \mathbb{R}$

الف) $y = x^2 - 4x + 6 \rightarrow x^2 - 4x + 2 = 0$

$y = x^2 - 4x + 6 \rightarrow (x-2)^2 + 2 = y \rightarrow (x-2)^2 = y-2 \rightarrow x-2 = \pm \sqrt{y-2}$

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ب) $y = x^2 - 5x + 1 \rightarrow x^2 - 5x + 1 - y = 0$

$\Delta = 25 - 4(1-y) \rightarrow 25 - 4 + 4y \geq 0 \rightarrow 21 + 4y \geq 0$

$x = \frac{5 \pm \sqrt{21+4y}}{2} \rightarrow y \geq -\frac{21}{4} \rightarrow R = [-\frac{21}{4}, +\infty)$

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الف) $y = \frac{x^2+3}{x^2-2}$

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

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

$R_f = (-\infty, -\frac{1}{5}] \cup (2, +\infty)$

$|x| \geq \frac{-4y-1}{1-y} \rightarrow \frac{-4y-1}{1-y} \geq 0$

$\frac{-4y-1}{1-y} \geq 0 \rightarrow \frac{-4y-1}{1-y} \geq 0$

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$R_f = (-\infty, -\frac{1}{5}] \cup (2, +\infty)$

$y = \frac{1}{x^2-4x}$

$y(x^2-4x) = 1 \rightarrow yx^2 - 4yx - 1 = 0 \rightarrow \Delta = 16y^2 - 4(-1)(y) \rightarrow 16y^2 + 4y \geq 0$

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$x = \frac{4y \pm \sqrt{16y^2+4y}}{2y}$

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

$\frac{-1}{4} \leq 0$

الف) $y = x^2 - 6x + 2 \rightarrow \min_{x \in \mathbb{R}} \rightarrow \left[\frac{-b}{2a} \right] = \left[\frac{3}{1} \right] = 3 \rightarrow R_f = [-5, +\infty)$

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ب) $y = -x^2 + 4x + 2 \rightarrow \max_{x \in \mathbb{R}} \rightarrow \left[\frac{-b}{2a} \right] = \left[\frac{2}{-1} \right] = -2 \rightarrow R_f = (-\infty, 6]$

الف) $y = \sqrt{x^2 - 6x + 2} \rightarrow \min_{x \in \mathbb{R}} \rightarrow \left[\frac{-b}{2a} \right] = \left[\frac{3}{1} \right] = 3 \rightarrow R_f = \sqrt{[-5, +\infty)} \rightarrow R_f = [0, +\infty)$

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ب) $y = \sqrt{-x^2 + 4x + 1} \rightarrow \max_{x \in \mathbb{R}} \rightarrow \left[\frac{-b}{2a} \right] = \left[\frac{2}{-1} \right] = -2 \rightarrow R_f = \sqrt{[-\infty, 6]} \rightarrow R_f = [0, \sqrt{6}]$

الف) $y = x^4 + 3x^2 + 2x + 1 \rightarrow R_f = \mathbb{R}$

فقط هست

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(۷)

ب) $y = \sqrt{x^4 + 4x^2 + 6x + 1} \rightarrow R_f = \sqrt{\mathbb{R}} \rightarrow R_f = [0, +\infty)$

الف) $y = \frac{3x+1}{x-2} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow R_f = \mathbb{R} - \left\{ \frac{1}{2} \right\}$

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ب) $y = \sqrt{\frac{4x+1}{x+3}} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow R_f = [0, +\infty) - \left\{ \frac{1}{3} \right\}$

الف) $y = \frac{3x+1}{x-2}$

ب) $y = \frac{4x-2}{1-2x}$
تابع معکوس است
نیت.

مجاذب نام $x-2 \neq 0 \rightarrow x \neq 2$

مجاذب افقی $\frac{a}{c} \rightarrow 3$

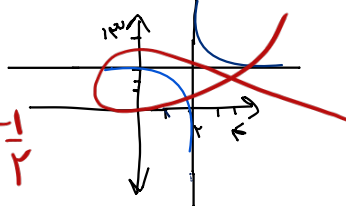
نقطه کتبی $\left(\frac{c}{a}\right)$

$ad=bc$ $g, 2 \left(\frac{1}{2}+1\right)$

$\leftarrow 0.4 \alpha$
 $-2(-2) = 4(1)$

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

۱، ۷، ۵

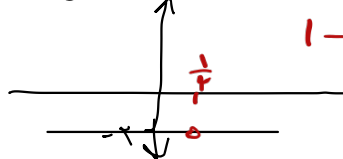


$R_f = \mathbb{R} - \{3\}$

$R_f = \{-2\}$

$1-2x \neq 0 \rightarrow x \neq \frac{1}{2}$

۱، ۲، ۵



۱، ۵ (۱۵)

الف) $y = \cos^2 x + \frac{1}{\cos^2 x} \rightarrow a^2 + \frac{1}{a^2} \rightarrow R_f = [2, +\infty)$

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

$x > 0 \rightarrow (\sqrt{2}, +\infty)$

$x < 0 \rightarrow (-\infty, \sqrt{2})$

زهراسماری