

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

ب) $y = x^2 + 1$ $\Rightarrow x^2 = y - 1 \Rightarrow x = \pm \sqrt{y-1} \Rightarrow R_f = [1, +\infty)$ ✓

الف) $y = x^2 - 2x + 4$ $\Rightarrow y = (x-1)^2 + 3 \Rightarrow x = 1 \pm \sqrt{y-3}$

$\Rightarrow R_f = [3, +\infty)$ ✓ $\{1 < x + \frac{1}{x}\}$

ب) $y = x^2 - 2x + 1 = x^2 - 2x + 4 - 3 = (x-1)^2 - 3$ $\Rightarrow (x-1)^2 = y+3 \Rightarrow x-1 = \pm \sqrt{y+3} \Rightarrow x = 1 \pm \sqrt{y+3}$

$y+3 = (x-1)^2 \Rightarrow \pm \sqrt{y+3} + 1 = x \Rightarrow R_f = [-3, +\infty)$ ✓

الف) $y = \frac{x^2+4}{x^2-4}$

$\frac{y+4}{y-4} = x^2 \Rightarrow x = \pm \sqrt{\frac{y+4}{y-4}}$ $\Rightarrow R_f = (-\infty, -1) \cup (1, +\infty)$ ✓

$\frac{-1}{x-1} - 1 +$

$\Rightarrow R_f = (-\infty, -1) \cup (1, +\infty)$ ✓

ب) $\frac{2|x|+1}{|x|-2} = y \Rightarrow |x| = \frac{y+1}{y-2}$

$\frac{-1}{y-2} - 1 +$

$\frac{-1}{y-2} - 1 +$

$[2, +\infty) \cup (-\infty, -\frac{1}{2}]$ ✓

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

$yx^2 - 2xy = 1 \Rightarrow yx^2 - 2xy - 1 = 0$

$\Rightarrow x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \Rightarrow \Delta \geq 0 \Rightarrow 4y^2 + 4y \geq 0$

$\frac{-1}{x-1} - 1 +$

$\Rightarrow y(y+1) \geq 0$
 $xy \neq 0 \Rightarrow y \neq 0$

$R_f = (-\infty, -1) \cup (0, +\infty)$ ✓

الف) $y = x^2 - 4x + 4$

$\min |x-2| = 0 \Rightarrow [2, +\infty)$ ✓

طبق سببی اول

ب) $-x^2 + 4x + 4 = y$

$\max |x-2| = 2 \Rightarrow (-\infty, -2] \cup [6, +\infty)$ ✓

طبق سببی اول

الف $y = \sqrt{x^2 - 4x + 4} \cdot y \min$

$\sqrt{-\infty, +\infty} \Rightarrow [0, +\infty) = \mathbb{R}_f$

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ب $y = \sqrt{-x^2 + 4x + 1} \cdot y$

$\max \sqrt{-\infty, 14} \Rightarrow \mathbb{R}_f = [0, +\infty]$

$\mathbb{R}_f = [0, \sqrt{14}]$

الف $y = x^3 + 2x^2 + 4x + 1$

$\mathbb{R}_f = \mathbb{R}$ ✓ (110)

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ب $y = \sqrt{x^3 + 2x^2 + 4x + 1}$

$\sqrt{\mathbb{R}}$

$\Rightarrow [0, +\infty) = \mathbb{R}_f$

(110)

الف $y = \frac{3x+1}{x-2}$

$\mathbb{R}_f = \mathbb{R} - \{2\}$ ✓ (110)

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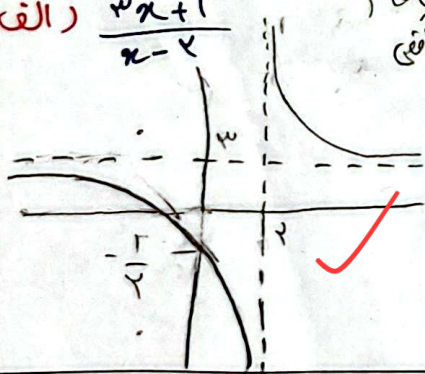
ب $y = \sqrt{\frac{2x+1}{x+2}}$

$\Rightarrow [0, +\infty) - \{2\} = \mathbb{R}_f$

110

الف $y = \frac{3x+1}{x-2}$

مشتق = 0
مشتق = 0

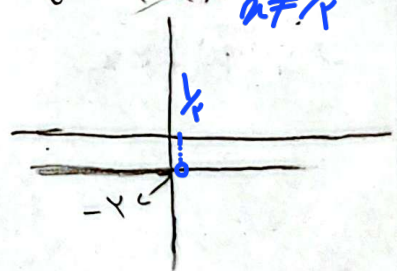


$x=0 \Rightarrow y = -1/2$

$y = -1/2$ (110)

ب $y = \frac{2x-2}{1-2x}$

$y = \frac{-2(1-x)}{1-2x}$ a ≠ 1/2



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الف $y = \cos^2 x + \frac{1}{\cos^2 x}$

$\Rightarrow \cos^2 x \geq 0 \Rightarrow \mathbb{R}_f = [+\infty, +\infty)$ (110)

$\mathbb{R}_f = [+\infty, +\infty)$ ✓

ب $y = \sqrt{\frac{x^2+1}{x}}$

$y = \sqrt{\frac{x^2}{x} + \frac{1}{x}} = \sqrt{x + \frac{1}{x}}$

$= \sqrt{x + \frac{1}{x}}$

$\Rightarrow \mathbb{R}_f = \sqrt{[-\infty, +\infty) \cup (-\infty, +\infty)} \rightarrow \mathbb{R}_f = (-\infty, \sqrt{-2}] \cup [\sqrt{2}, +\infty)$

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