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۱) $y = \sqrt{x-1} + 1 \Rightarrow (x-1) = (y-1)^2 \Rightarrow x = (y-1)^2 + 1 \Rightarrow x = y^2 - 2y + 2 \Rightarrow x - y^2 + 2y - 2 = 0$
 (الف) $y = \sqrt{x-1} + 1 \Rightarrow x = y^2 - 2y + 2 \Rightarrow x - y^2 + 2y - 2 = 0$
 (ب) $y = \frac{1}{x-2} \Rightarrow \frac{1}{x-2} = y \Rightarrow x-2 = \frac{1}{y} \Rightarrow x = \frac{1}{y} + 2 \Rightarrow R_f = \mathbb{R} - \{0\}$ ✓

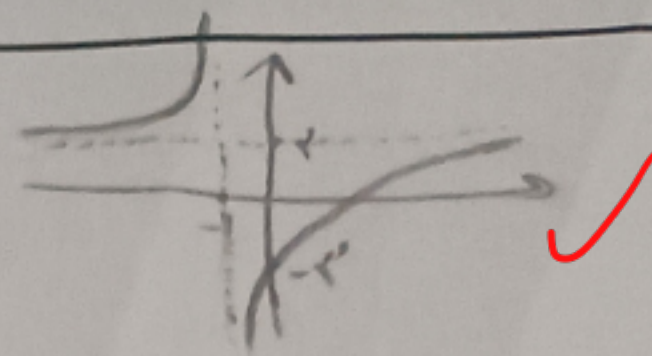
۲) $y = \sqrt{x-4} + 2 \Rightarrow (y-2) = \sqrt{x-4} \Rightarrow (y-2)^2 = x-4 \Rightarrow x = (y-2)^2 + 4 \Rightarrow x = y^2 - 4y + 8$
 (الف) $y = \sqrt{x-4} + 2 \Rightarrow x = y^2 - 4y + 8 \Rightarrow x - y^2 + 4y - 8 = 0$
 (ب) $y = \sqrt{x-4} + 2 \Rightarrow x = y^2 - 4y + 8 \Rightarrow x - y^2 + 4y - 8 = 0$
 (ج) $y = \sqrt{x-4} + 2 \Rightarrow x = y^2 - 4y + 8 \Rightarrow x - y^2 + 4y - 8 = 0$
 (د) $y = \sqrt{x-4} + 2 \Rightarrow x = y^2 - 4y + 8 \Rightarrow x - y^2 + 4y - 8 = 0$

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 (د) $y = \sqrt{x-4} + 2 \Rightarrow x = y^2 - 4y + 8 \Rightarrow x - y^2 + 4y - 8 = 0$

۴) $y = \frac{x+1}{x-2} \Rightarrow y(x-2) = x+1 \Rightarrow yx - 2y = x+1 \Rightarrow yx - x = 2y+1 \Rightarrow x(y-1) = 2y+1 \Rightarrow x = \frac{2y+1}{y-1}$
 (الف) $y = \frac{x+1}{x-2} \Rightarrow x = \frac{2y+1}{y-1} \Rightarrow R_f = \mathbb{R} - \{1\}$
 (ب) $y = \frac{x+1}{x-2} \Rightarrow x = \frac{2y+1}{y-1} \Rightarrow R_f = \mathbb{R} - \{1\}$

۵) $y = \sqrt{\frac{x+4}{x-1}} \Rightarrow y^2 = \frac{x+4}{x-1} \Rightarrow y^2(x-1) = x+4 \Rightarrow y^2x - y^2 = x+4 \Rightarrow y^2x - x = y^2 + 4 \Rightarrow x(y^2-1) = y^2+4 \Rightarrow x = \frac{y^2+4}{y^2-1}$
 (الف) $y = \sqrt{\frac{x+4}{x-1}} \Rightarrow x = \frac{y^2+4}{y^2-1} \Rightarrow R_f = \mathbb{R} - \{1\}$
 (ب) $y = \sqrt{\frac{x+4}{x-1}} \Rightarrow x = \frac{y^2+4}{y^2-1} \Rightarrow R_f = \mathbb{R} - \{1\}$

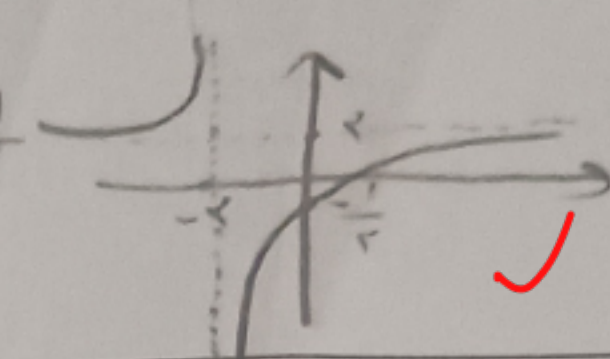
الف) $y = \frac{x-2}{x+1}$ $\rightarrow$ جانب مائل $\rightarrow x+1=0 \rightarrow x=-1$
 نقطة لول $\rightarrow$ جانب آخر $= \frac{a}{c} = \frac{-2}{1} = -2$



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6

ب) $y = \frac{x-1}{x+2}$ $\rightarrow$ جانب مائل $\rightarrow x+2=0 \rightarrow x=-2$
 نقطة لول $\rightarrow$ جانب آخر $= \frac{a}{c} = \frac{-1}{1} = -1$



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7

الف) $y = \sin x + \frac{1}{\sin x} \rightarrow R_y = (-\infty, -2] \cup [2, +\infty)$

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

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

د) $y = \sqrt{x} + \frac{1}{\sqrt{x}} \rightarrow R_y = [2, +\infty)$

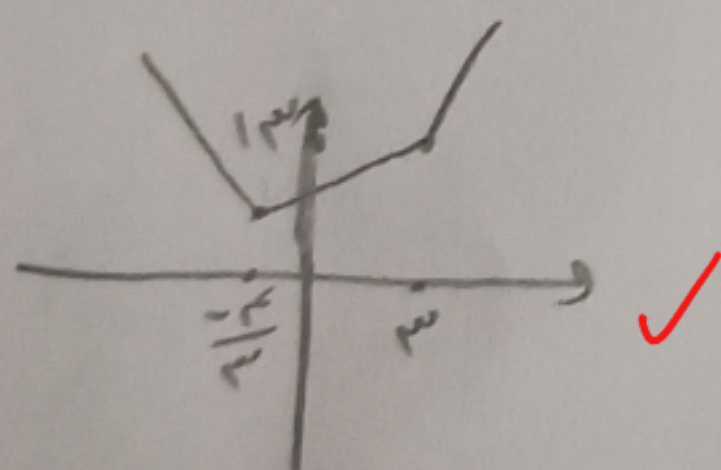
الف) $y = x^2 + \frac{1}{x^2+2} \rightarrow x^2 + 2 + \frac{1}{x^2+2} \rightarrow x^2 + \frac{1}{x^2+2} \rightarrow \frac{1}{2} \rightarrow [\frac{1}{2}, +\infty)$

(2)

8

ب) $y = \frac{x^2+5}{\sqrt{x^2+4}} = \frac{x^2+4+1}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \rightarrow R_y = [2, +\infty)$

$y = |x-2| + |x+1|$ $\begin{cases} x > 2 \rightarrow x-2+x+1 = x-1 \\ -1 < x < 2 \rightarrow -x+2+x+1 = x+3 \\ x < -1 \rightarrow -x+2-x-1 = -2x+1 \end{cases}$



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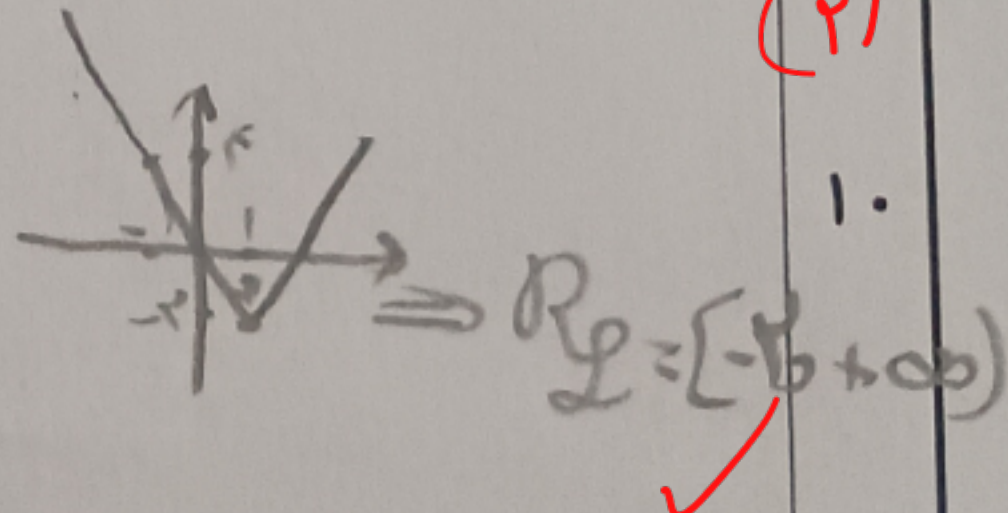
9

الف) $y = |x-2| + |x+1|$ $\begin{cases} x > 2 \rightarrow x-2+x+1 = x-1 \\ -1 < x < 2 \rightarrow -x+2+x+1 = x+3 \\ x < -1 \rightarrow -x+2-x-1 = -2x+1 \end{cases} \Rightarrow R_y = [3, +\infty)$

(2)

10

ب) $y = |2x-5| - |x+1|$ $\begin{cases} x > 1 \rightarrow 2x-5-x-1 = x-6 \\ -1 < x < 1 \rightarrow -2x+5-x-1 = -3x+4 \\ x < -1 \rightarrow -2x+5-x-1 = -3x+4 \end{cases}$



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