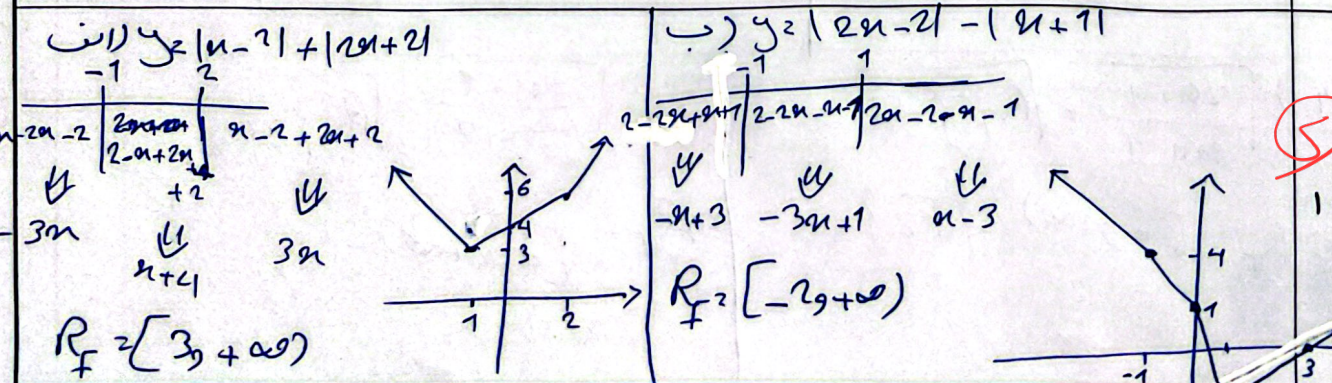
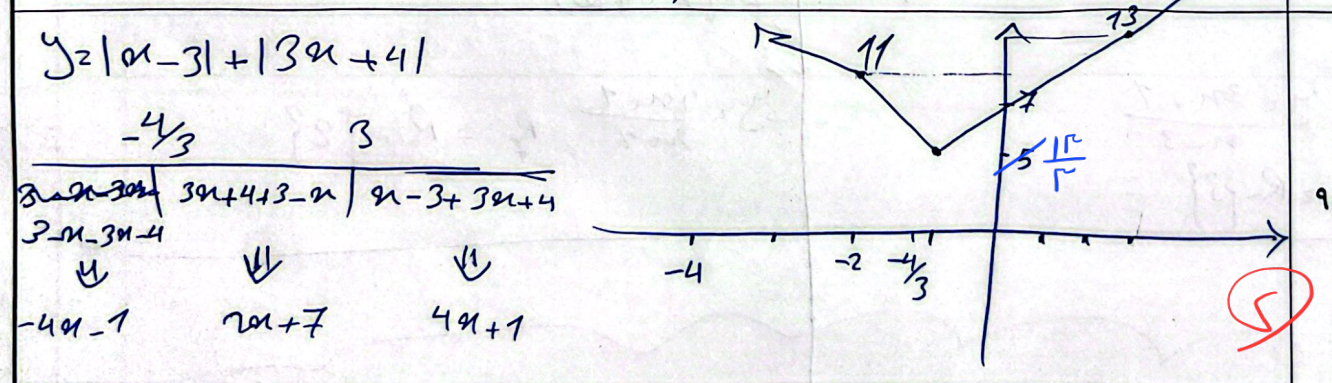
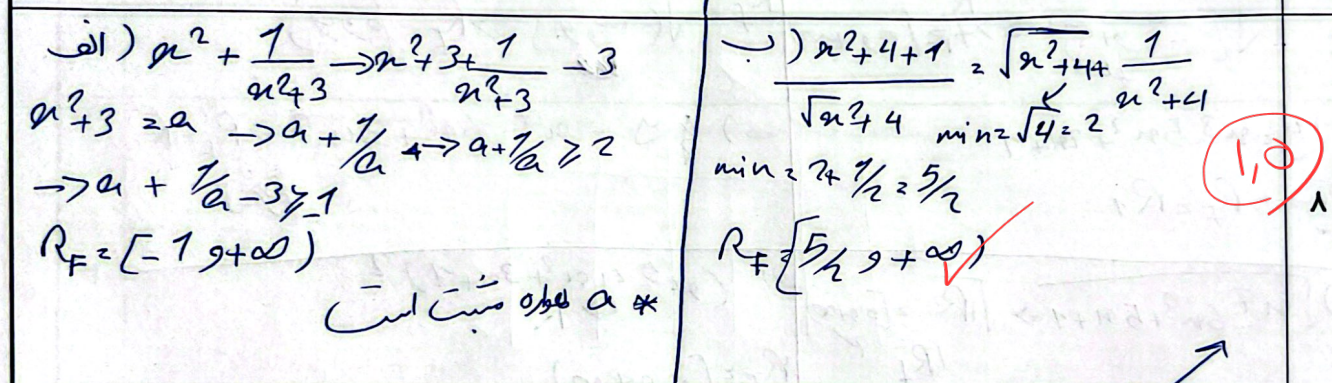
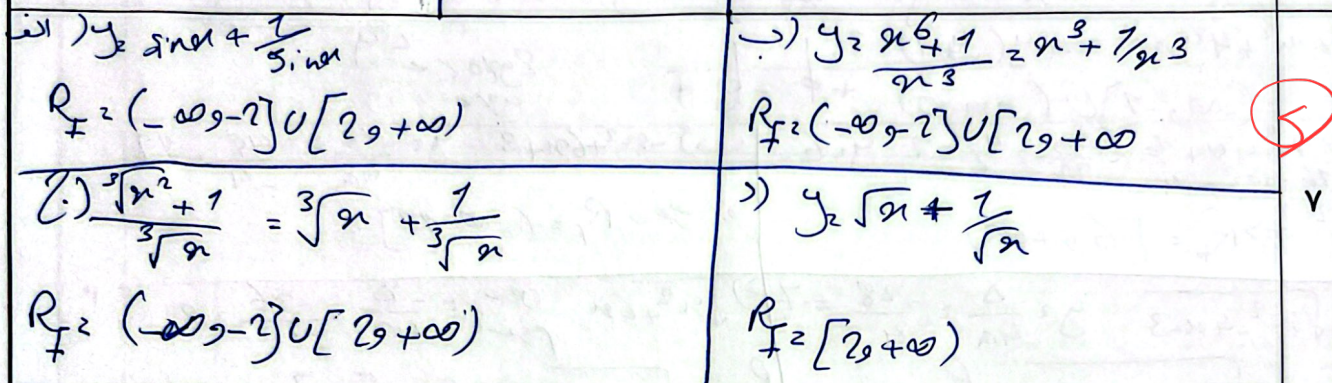
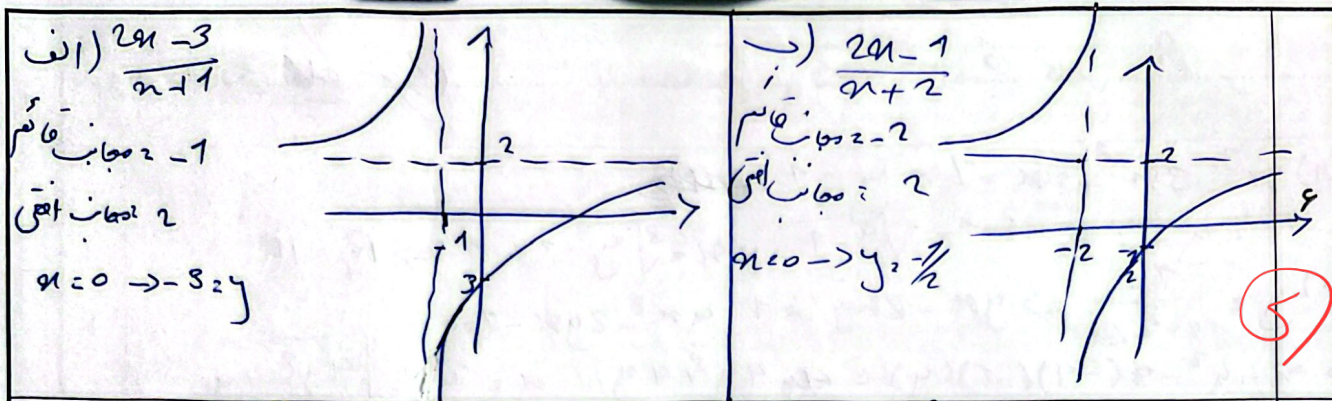


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الف) $x^3 - 3x^2 + 3x - 7 = y - 1$ $(x-1)^3 = y - 1 \Rightarrow x-1 = \sqrt[3]{y-1} \Rightarrow x = \sqrt[3]{y-1} + 1 \Rightarrow R_f = \mathbb{R}$ ب) $y = \frac{x^2-2x}{1} \Rightarrow yx^2 - 2xy = 1 \Rightarrow yx^2 - 2yx - 1 = 0$ $\Delta \Rightarrow 4y^2 - 4(-1)(-1)(y) = 4y^2 - 4y$ $x = \frac{2y \pm \sqrt{4y^2 - 4y}}{2y}$ $4y^2 - 4y \geq 0 \Rightarrow 4y(y-1) \geq 0$ $R_f = (-\infty, -1] \cup (0, +\infty)$	۱
الف) $x^2 - 4x + 10 = \frac{1}{2} \Rightarrow x^2 - 4x + \frac{19}{2} = 0$ $\Delta = 16 - 4 \times \frac{19}{2} = -24$ $\Rightarrow R_f = [6, +\infty)$	ب) $-x^2 + 6x + 3 = y \Rightarrow \frac{\Delta}{4a} = \frac{-48 - 12}{-4} = 12$ $\Rightarrow R_f = (-\infty, 12]$ ۱۷۵
ج) $\sqrt{x^2 - 4x - 3} = y \Rightarrow \frac{\Delta}{4a} = \frac{-28}{4} = -7$ $R_f = \sqrt{[-7, +\infty)} \Rightarrow R_f = [0, +\infty)$	د) $\sqrt{x^2 + 6x} = y \Rightarrow \frac{\Delta}{4a} = \frac{-36}{-4} = 9$ $R_f = \sqrt{[-9, +\infty)} \Rightarrow R_f = [0, +\infty)$ ۲
الف) $y = x^3 - 5x^2 + 2x + 1$ $\Rightarrow R_f = \mathbb{R}$	ب) $y = x^3 - 6x^2 + 3x + 2 \Rightarrow R_f = \mathbb{R}$ ۳
ج) $\sqrt{x^2 - 6x^2 + 5x + 1} \Rightarrow \sqrt{R} = [0, +\infty)$ $R_f = [0, +\infty)$	د) $(x^2 - 4x^2 + 3x + 1)^2$ $\Rightarrow R_f = [0, +\infty)$
الف) $y = \frac{3x+1}{x-3}$ $R_f = \mathbb{R} - \{3\}$	ب) $y = \frac{2x+2}{x+1} \Rightarrow R_f = \mathbb{R} - \{2\}$ ۴
الف) $\sqrt{\frac{2x+4}{x+1}} = \sqrt{R - \{2\}}$ $\Rightarrow R_f = [0, +\infty) - \{\sqrt{2}\}$	ب) $\sqrt{\frac{3x+1}{-x+2}} = \sqrt{R - \{3\}}$ $\Rightarrow R_f = [0, +\infty)$ ۵



$$x^r + r + \frac{1}{x^r + r} - r \xrightarrow{x^r} \frac{1}{r} \quad R = [\frac{1}{r}, +\infty)$$