

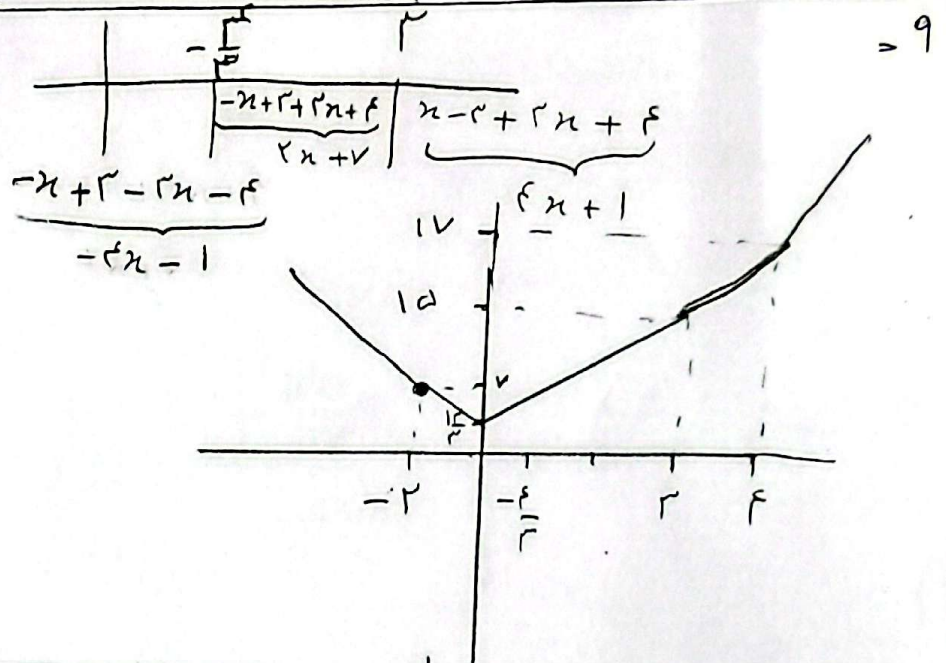
الف) $y = x^r + \frac{1}{x^r + r} = x^r + r + \frac{1}{x^r + r} - r$ $\left(a + \frac{1}{a} \right) > r \xrightarrow{x=0} a = r$
 $R_F = \left[\frac{1}{r}, +\infty \right) \leftarrow -r a + \frac{1}{a} = \left[\frac{1}{r}, +\infty \right) \leftarrow y = r + \frac{1}{r} = \frac{1}{r} + r$

ب) $y = \frac{x^r + a}{\sqrt{x^r + r}} \rightarrow y = \frac{x^r + r + 1}{\sqrt{x^r + r}} \rightarrow y = \sqrt{x^r + r} + \frac{1}{\sqrt{x^r + r}} \quad R_F = \left[r, +\infty \right)$

$y = |x - r| + |rx + r|$

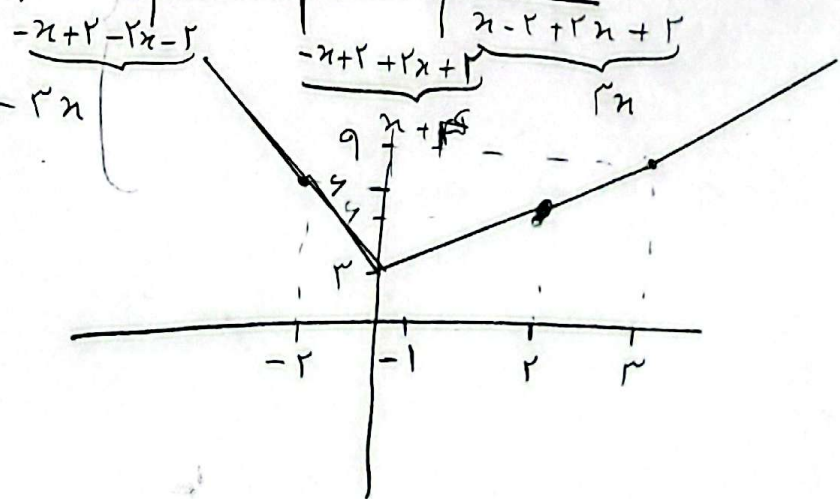
$$\begin{cases} rx + 1 & x > r \\ rx + r & -\frac{r}{r} \leq x \leq r \\ -rx - 1 & x < -\frac{r}{r} \end{cases}$$

$-\frac{r}{r} + r = -\frac{r}{r} + r$



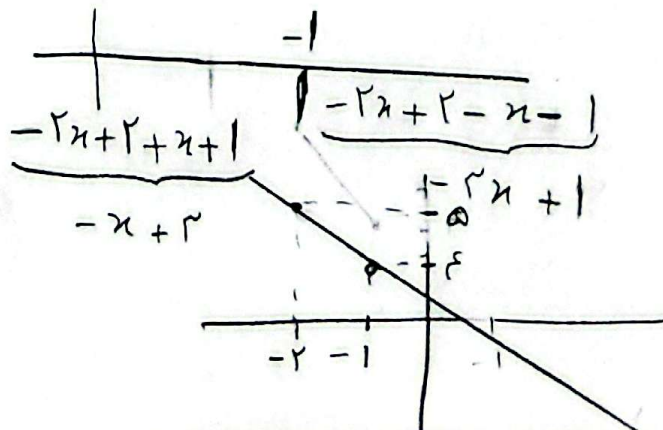
انف) $y = |x - r| + |rx + r|$

$$\begin{cases} rx & x > r \\ x + r & -1 \leq x \leq r \\ -rx & x < -1 \end{cases}$$



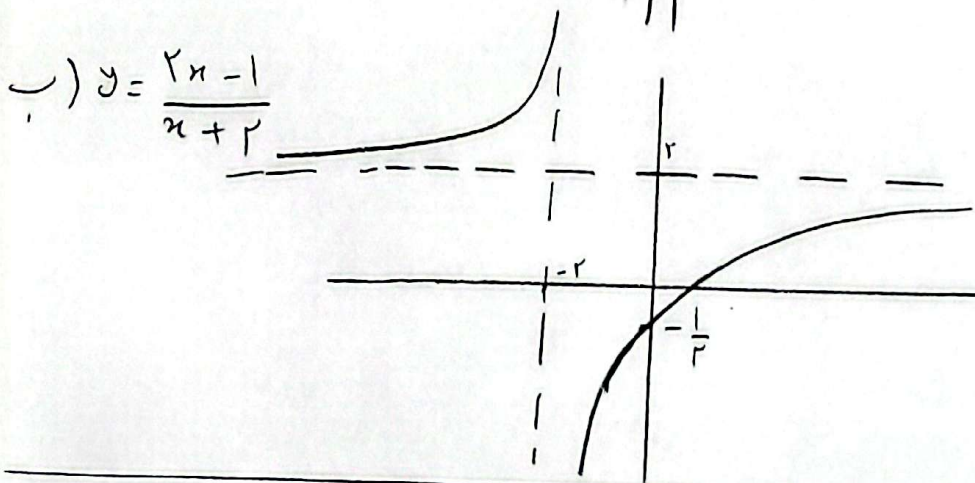
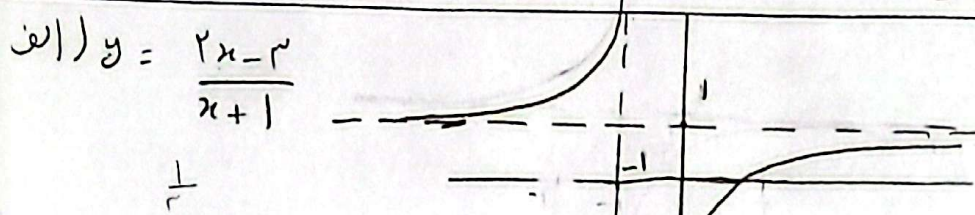
ب) $|2x - r| - |x + 1|$

$$\begin{cases} -2x + 1 & x \geq -1 \\ -x + r & x < -1 \end{cases}$$



الف) $y = \sqrt{\frac{2x+4}{x+1}}$ $\xrightarrow{\text{بر روش توابع معکوس}} R_f = [0, +\infty) - \{-1, \sqrt{2}\}$

ب) $y = \sqrt{\frac{2x+1}{2-x}}$ $\xrightarrow{\text{بر روش توابع معکوس}} R_f = [0, +\infty) - \{2\}$



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

ب) $y = \frac{x^4+1}{x^3}$ $\frac{x^4+1}{x^3} = x + \frac{1}{x^3}$ $R_f = [2, +\infty) \cup (-\infty, -2]$

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

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