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① (الف) $y = x^m - x^n + x^p + 1 \rightarrow y = (x-1)^m + 1 \rightarrow \sqrt{y-1} = x-1 \rightarrow x = \frac{y-1}{2}$

$\rightarrow R_f = R$

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

② (الف) $y = \frac{x}{x^2 - 4} \rightarrow R_f = [4, +\infty)$

③ (الف) $y = \frac{x}{x^2 + 1} \rightarrow R_f = [1, +\infty)$

④ (الف) $y = \frac{x}{x^2 - 1} \rightarrow R_f = [-1, +\infty)$

⑤ (الف) $R = R_f \rightarrow R_f = [0, +\infty)$

⑥ (الف) $R = R_f \rightarrow R_f = [0, +\infty)$

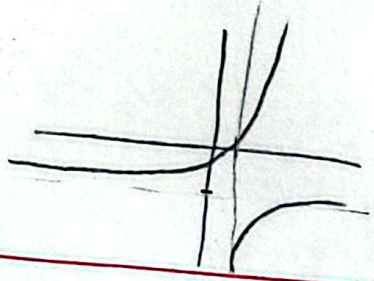
⑦ (الف) $R_f = R - [n]$

⑧ (الف) $R_f = R - [r]$

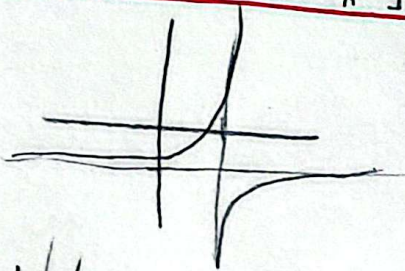
⑨ (الف) $R_f = [0, +\infty) - [r]$

⑩ (الف) $R_f = [0, +\infty) \cup R_f$

ملاحظة: $\frac{c}{a} = 1 \rightarrow c = a$



① (الف) $R_f = R - [r]$



② (الف) $(-\infty, -r] \cup [r, +\infty) = R$

③ (الف) $\frac{x}{x^2 + 1} \rightarrow (-\infty, -r] \cup [r, +\infty)$

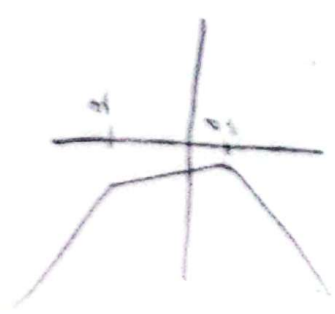
④ (الف) $\frac{x}{x^2 + 1} \rightarrow (-\infty, -r] \cup [r, +\infty)$

⑤ (الف) $\frac{x}{x^2 + 1} \rightarrow (-\infty, -r] \cup [r, +\infty)$

⑥ (الف) $\frac{x}{x^2 + 1} \rightarrow (-\infty, -r] \cup [r, +\infty)$

⑦ (الف) $\frac{x}{x^2 + 1} \rightarrow (-\infty, -r] \cup [r, +\infty)$

$$\begin{aligned}
 x > 0 &\rightarrow f(x) = 1 \\
 -\frac{1}{2} < x < 0 &\rightarrow f(x) = x + 1 \\
 x < -\frac{1}{2} &\rightarrow f(x) = 2x + 2
 \end{aligned}$$

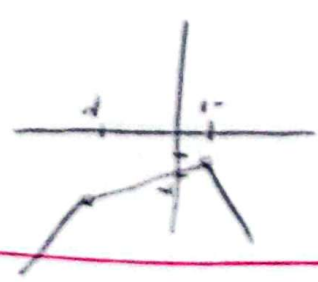


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$$\begin{array}{c|c|c}
 x & x+1 & x-1 \\
 \hline
 1 & 2 & 0
 \end{array}$$

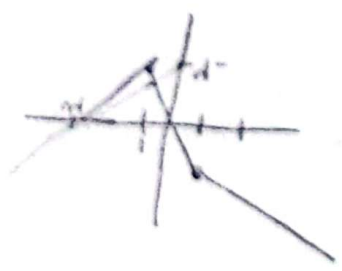
(iii)



$$f(x) = [x + \infty)$$

$$\begin{array}{c|c|c}
 x & x+1 & x-1 \\
 \hline
 1 & 2 & 0
 \end{array}$$

(ii)



$$f(x) = [x + \infty)$$