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یازدهم فصل

کلیف

نمایش ساده تری

الف) $y = x^3 - 3x^2 + 3x$

5) 1

$$y = x^3 - 3x^2 + 3x - 1 + 1$$

$$y = (x-1)^3 + 1 \rightarrow (x-1)^3 = y-1$$

$$x-1 = \sqrt[3]{y-1}$$

$$\leftarrow x = \sqrt[3]{y-1} + 1$$

$$R_f = \mathbb{R}$$

ب) $y = \frac{1}{x^2 - 2x} \rightarrow y = \frac{1}{x^2 - 2x + 1 - 1} \rightarrow y = \frac{1}{(x-1)^2 - 1}$

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

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

$$\frac{-1}{+1} \leq \frac{0}{+1}$$

$$\frac{y+1}{y} \geq 0$$

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

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

الف) $y = x^2 - 4x + 10$

$$\min \left| x_s = \frac{-b}{2a} = 2 \right.$$

$$y_s = (2)^2 - 4(2) + 10 = 4$$

5) 2

$$R_f = [4, +\infty)$$



$$1) y = -x^2 + 4x + 1 \xrightarrow{\max} \begin{cases} x_s = \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ y_s = -(2)^2 + 4(2) + 1 = 12 \end{cases}$$

$$R_f = (-\infty, 12]$$

$$2) y = \sqrt{x^2 - 4x - 1} \xrightarrow{\min} \begin{cases} x_s = \frac{-b}{2a} = \frac{+4}{2} = 2 \\ y_s = (2)^2 - 4(2) - 1 = -1 \end{cases}$$

$$R_f = \sqrt{[-1; +\infty)} \rightarrow R_f = [0; +\infty)$$

$$3) y = \sqrt{4x - x^2} \xrightarrow{\max} \begin{cases} x_s = \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ y_s = 4(2) - (2)^2 = 4 \end{cases}$$

$$R_f = \sqrt{(-\infty, 4]} \rightarrow R_f = [0, 4]$$

الف) $y = x^4 - 2x^2 + 2x + 1$ (3) بزرگترین توان فرد است

$$R_f = \mathbb{R}$$

ب) $y = x^5 - 4x^3 + 2x + 1$ $R_f = \mathbb{R}$

ج) $y = \sqrt{x^5 - 4x^3 + 2x + 1} \rightarrow R_f = \sqrt{\mathbb{R}} = [0; +\infty)$

د) $y = (x^5 - 4x^3 + 2x + 1)^2 \rightarrow R_f = [0; +\infty)$

الف) $y = \frac{x+1}{x-2}$ (4) تابع همگرافیک است $bc \neq ad$

$$R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow R_f = \mathbb{R} - \{2\}$$

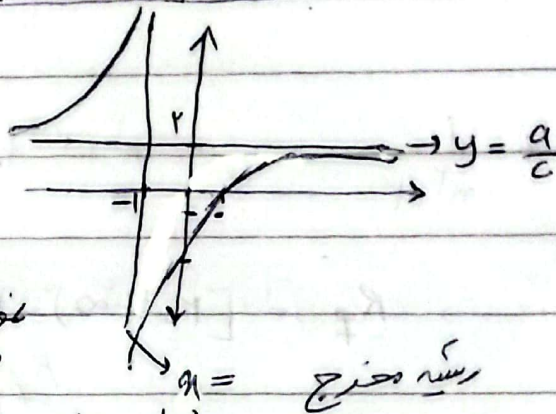
ب) $y = \frac{x+1}{x+1} \rightarrow yx + y = x + 1$
 $(y-1)x = 1-y \rightarrow x = \frac{-y+1}{y-1} \rightarrow R_f = \mathbb{R} - \{1\}$



الف) $y = \sqrt{\frac{2n+4}{n+1}} \rightarrow R_f = \sqrt{1R - \{2\}} \rightarrow R_f = [0, +\infty) - \{\sqrt{2}\}$ (5)

ب) $y = \sqrt{\frac{2n+1}{2-n}} \rightarrow R_f = \sqrt{1R - \{-2\}} \rightarrow R_f = [0, +\infty)$

الف) $y = \frac{2n-2}{n+1}$

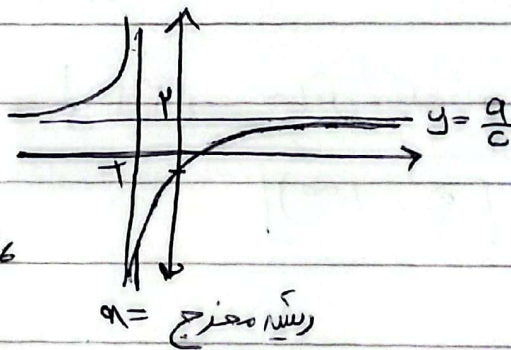


$ad - bc > 0$

$2 - (-2) > 0 \rightarrow$ نمودار صعودی است

$n = 1 \rightarrow \frac{2(1)-2}{2} = \frac{-1}{2} \rightarrow (1, -\frac{1}{2})$

ب) $y = \frac{2n-1}{n+2}$



$ad - bc > 0$

$2 - (-1) > 0 \rightarrow$ نمودار صعودی است

$n = 0 \rightarrow \frac{-1}{2} \rightarrow (0, -\frac{1}{2})$

الف) $y = \sin n + \frac{1}{\sin n}$ $\sin n$ هم می تواند مثبت یا منفی باشد (7)

$R_f = (-\infty, -2] \cup [2, +\infty)$ (5)

ب) $y = \frac{n^4+1}{n^3} = n + \frac{1}{n^3}$

n^3 هم می تواند مثبت یا منفی باشد

$R_f = (-\infty, -2] \cup [2, +\infty)$

$$ع) y = \frac{\sqrt[n]{n^p + 1}}{\sqrt[n]{n}} = \sqrt[n]{n} + \frac{1}{\sqrt[n]{n}} \quad \text{هم می توانیم به این شکل بنویسیم}$$

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

$$2) y = \sqrt{n} + \frac{1}{\sqrt{n}} \quad \sqrt{n} > 0 \rightarrow R_f = [r, +\infty)$$

$$y = n^r + \frac{1}{n^r + r} \rightarrow y = n^r + r + \frac{1}{n^r + r} - r \quad \textcircled{5} \textcircled{1}$$

$$n^r + r > 0 \rightarrow \text{مقادیر مثبت} \rightarrow (n^r + r = r \rightarrow r + \frac{1}{r} = \frac{1}{r} \dots \dots \dots$$

$$R_f = [\frac{1}{r}, +\infty) - r = [\frac{1}{r}, +\infty)$$

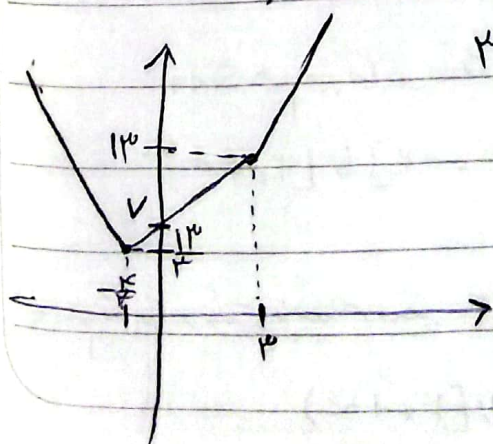
$$ب) y = \frac{n^r + \omega}{\sqrt[n]{n^r + \varepsilon}} = \sqrt[n]{n^r + \varepsilon} + \frac{1}{\sqrt[n]{n^r + \varepsilon}}$$

$$\sqrt[n]{n^r + \varepsilon} > 0 \rightarrow \text{مقادیر مثبت} \rightarrow r + \frac{1}{r} = \frac{\omega}{r}$$

$$R_f = [\frac{\omega}{r}, +\infty)$$

$$y = |n - r| + |r n + r|$$

$\textcircled{5} \textcircled{9}$

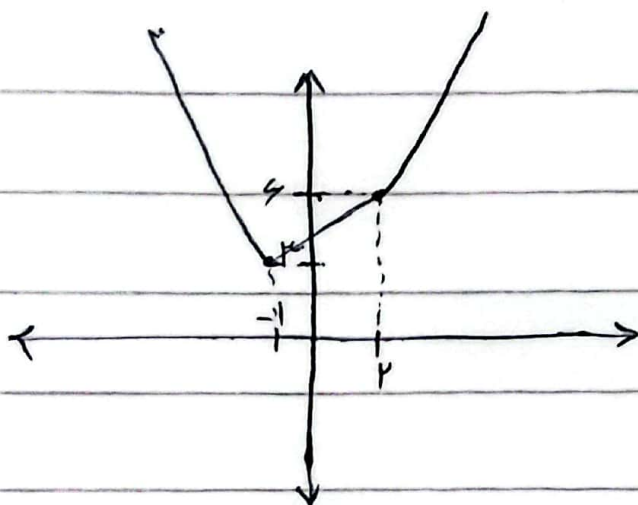


$r - n - r n - r$	$r - n + r n + r$	$n - r + r n + r$
$-r n - 1$	$r n + 1$	$r n + 1$

الف) $y = |x-2| + |2x+1|$ (10)

$2-x-2-2x =$	$2-x+2x+1 =$	$x-2+2x+1 =$
$-2x$	$x+3$	$3x-1$
2	-1	2

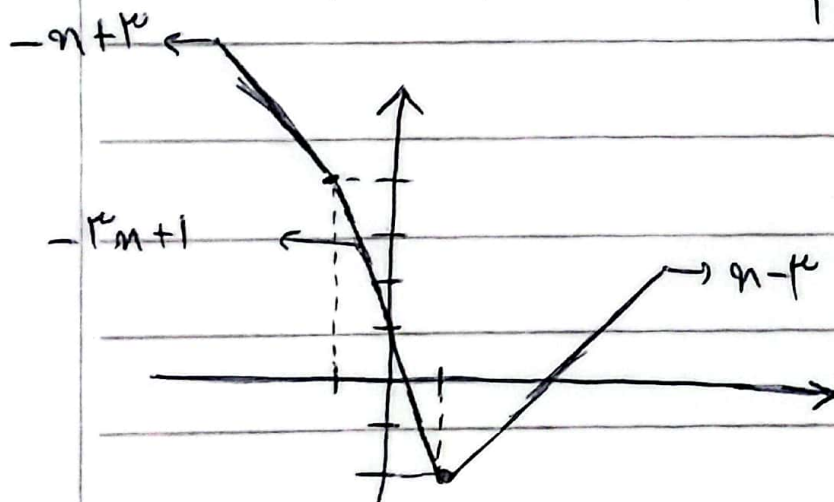
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$$R_f = [2, +\infty)$$

ب) $y = |2x-1| - |x+1|$

$2-2x+x+1 =$	$2-2x-x-1 =$	$2x-1-x-1 =$
$-x+3$	$-3x+1$	$x-2$
1	1	2



$$R_f = [-1, +\infty)$$