

$$1-xf(-n) - xf(n) = (n+1)n$$

$$f(n) + xf(-n) = (n+1)$$

$$f(n)(-n^2-1) = (n+1)(n-1)$$

$$\Rightarrow f(n) = \frac{(n+1)(n-1)}{-n^2-1}$$

$$-n^2 f(n) - f(n) = (n+1)n - (n+1)$$

$$2- f(n) + f(0) = n^2 - 3n + 9$$

$$n=0 \rightarrow f(0) + f(0) = 9 \Rightarrow f(0) = \frac{9}{2}$$

$$\Rightarrow f(n) = n^2 - 3n + \frac{9}{2}$$

$$3- y = \frac{x^2 + x + 1}{n-1} \rightarrow x^2 + x + 1 = y(n-1) \rightarrow x^2 + x + 1 = yn - y \rightarrow x^2 + x + y = yn$$

$$\rightarrow y^2 - 4y - 1 > 0 \rightarrow (y-2)(y+1) > 0 \rightarrow y < -1 \text{ or } y > 1$$

$$\Rightarrow R_f = \mathbb{R} - (-1, 1)$$

$$4- \text{a)} y = \frac{x^2}{n-1} \rightarrow y_{\min} = \frac{\Delta}{4a} = \frac{1}{n} \Rightarrow R_f = [\frac{1}{n}, +\infty)$$

$$\text{b)} y = \sqrt{x^2 + 4x - 4} \rightarrow y_{\min} = -2 \Rightarrow R_f = [-2, +\infty)$$

$$\text{c)} y = \sqrt{x^2 - 4x + 1} \rightarrow R_f = \mathbb{R} \Rightarrow R_f = [-1, +\infty)$$

$$\text{d)} \log(x^2 - 4x + 1)$$

$$5- \text{a)} y = \frac{x^2 + 1}{x-4} \rightarrow x = \frac{y+1}{y-4} \Rightarrow R_f = \mathbb{R} - \{\frac{5}{4}\}$$

$$\text{b)} y = \sqrt{\frac{x+1}{x-4}} \rightarrow \frac{x+1}{x-4} \rightarrow \mathbb{R} - \{4\} \Rightarrow R_f = [0, +\infty) - \{4\}$$

$$\text{c)} y = \frac{x^2 + 4}{x^2 + 1} = \frac{x^2 + 1 + 3}{x^2 + 1} = 1 + \frac{3}{x^2 + 1} \rightarrow \sqrt{1 + \frac{3}{x^2 + 1}} \Rightarrow R_f = [\frac{\sqrt{4}}{2}, +\infty)$$

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

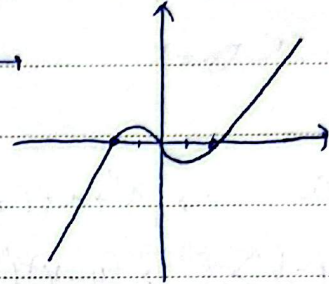
$$6- y = \frac{x^2 + 4}{x^2 - 1} \rightarrow x^2 = \frac{y+4}{y-1} \Rightarrow R_f = [0, 1) \cup (1, +\infty)$$

$$\text{b)} y = \frac{x^2}{x^2 - 1} \rightarrow \frac{x^2}{x^2 - 1} \rightarrow \mathbb{R} - \{1\} \Rightarrow R_f = [0, +\infty) - \{1\}$$

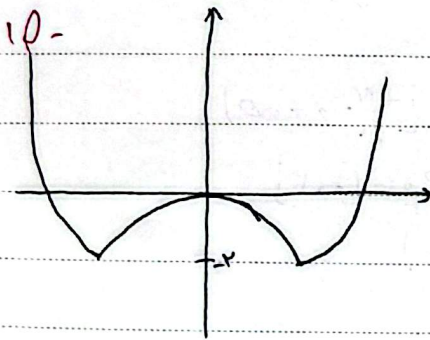
$$V- f(x) = \frac{x \sin x + \pi}{\sin x - \pi} \rightarrow \begin{cases} -1 \leq \sin x \leq 1 \\ f(-1) = -\frac{1}{\pi} \\ f(1) = -\pi \end{cases} \Rightarrow R_f = \left[-\pi, -\frac{1}{\pi}\right]$$

$$1- \text{ب) } y = \left| \frac{x-1}{x} \right| \rightarrow R_f = [0, +\infty) \quad \text{ب) } y = \sqrt{\frac{9x-11}{-1+x}} = \sqrt{\frac{9(x-1)}{x-1}} = \frac{3}{x} (x \neq 1) \Rightarrow R_f = \frac{3}{x}$$

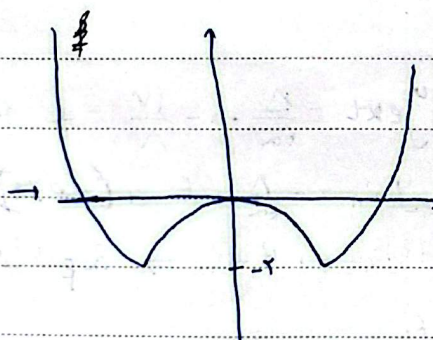
$$9- y = |x| - \pi \rightarrow f(x) = \begin{cases} x^2 - \pi & x \geq 0 \\ -x^2 - \pi & x \leq 0 \end{cases}$$



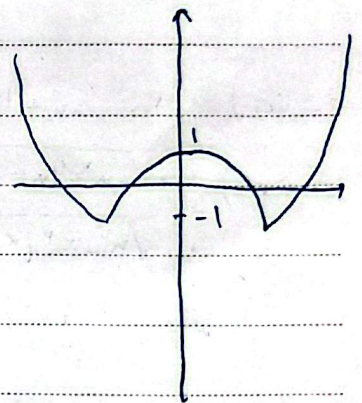
$$\Rightarrow R_f = \mathbb{R}$$



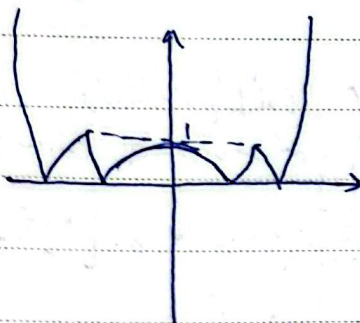
$$y = f(x)$$



$$y = f(|x|)$$



$$y = f(|x|) + 1$$



$$y = |f(|x|) + 1|$$

خوبی منظم بابت اینک 2 ایلک دورک
کردید و دعوای و طاعتیه
اسیلا وارم که چیتہ اتفاقات خوب
رفوشی تری زنده گاتون بیوفته
موفق باشید ♥