

$$y = \frac{|x|+1}{|x|-2} \Rightarrow y|x|-2y = |x|+1$$

$$|x|(y-1) = 2y+1$$

$$\Rightarrow |x| = \frac{2y+1}{y-1}$$

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

$$R_f = (-\infty, -\frac{1}{2}] \cup (1, +\infty)$$

$$y = \frac{x^2+1}{|x|} \Rightarrow y|x| = x^2+1$$

$$\Rightarrow x^2 - y|x| + 1 = 0$$

$$\Delta = y^2 - 2(1)(1) = y^2 - 2$$

$$y \geq \sqrt{2}$$

$$x_{1,2} = \frac{y \pm \sqrt{y^2-2}}{2}$$

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

$$y = \frac{x^2+2x-1}{x+2} \Rightarrow xy + 2y = x^2 + 2x - 1 \Rightarrow x^2 + (2-y)x - 2y - 1 = 0$$

$$\Delta = (2-y)^2 - 2(1)(-2y-1) = 1 - 2y + y^2 + 4y + 2 = y^2 + 2y + 3 = (y+1)(y+3)$$

$$x_{1,2} = \frac{-2 \pm \sqrt{(y+1)(y+3)}}{2}$$

$$\frac{-4}{+1-1+} \Rightarrow R_f = (-\infty, -4] \cup [-1, +\infty)$$

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

$$D_f = \mathbb{R}$$

$$\Rightarrow \frac{(x-\frac{1}{2})^2}{(x-\frac{1}{2})^2 + \frac{3}{4}}$$

$$R_f = [0, 1]$$

راه حل کامل

صفحه آخر...

$$y = \sqrt{-x^2+8x-1}$$

$$\Delta = 14 - 2(-1)(-1) = 12$$

$$\frac{-\Delta}{2a} = \frac{-12}{-2} = 6$$

$$R_f = [0, \sqrt{13}]$$

$$y = \sqrt{x^2-18x}$$

$$\Delta = 48$$

$$\frac{-\Delta}{2a} = \frac{-48}{2} = -24$$

$$R_f = [-24, +\infty)$$

$$y = \log(x^2-x+1)$$

$$10^y = x^2-x+1$$

$$x^2-x+1 > 0$$

$$R_f = \mathbb{R}$$

$$y = \log_2\left(\frac{x^2+1}{x}\right)$$

$$\frac{x^2+1}{x} > 0$$

$$x > 0$$

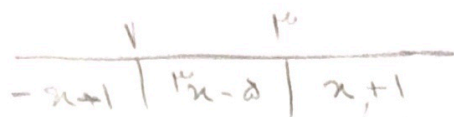
$$x + \frac{1}{x} \Rightarrow \frac{x^2+1}{x}$$

$$R_f = (1, +\infty)$$

$$w) f = |x-1| - |x-2|$$

$$y = |x-1| + |x+1|$$

(2) 6



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



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

$$|x-1| - |x+1| \leq 1$$



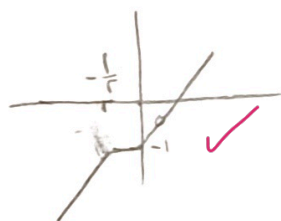
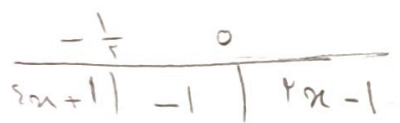
$$-x-1 \leq +1 \rightarrow x \geq -2$$

$$-x-1 \leq +1 \rightarrow x \geq -\frac{1}{r}$$

$$x+1 \leq +1 \rightarrow x \leq -r$$

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

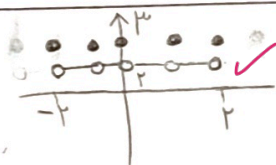
$$y = rx - |rx+1| + |x|$$



$$R_f = \mathbb{R}$$

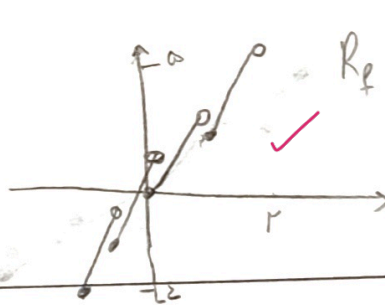
$$rx+1=0 \rightarrow x=-\frac{1}{r}$$

$$y = [x] + [-x] + r$$



$$R_f = \{r\}$$

$$y = rx - [x] \rightarrow \begin{aligned} -r \leq x < -1 &\rightarrow rx+r \\ -1 \leq x < 0 &\rightarrow rx+1 \\ 0 \leq x < 1 &\rightarrow rx \\ 1 \leq x < r &\rightarrow rx-1 \\ x=r &\rightarrow rx-r \end{aligned}$$



$$R_f = [r, \infty)$$

$$a) \sin^r x - \sin x + 1$$

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

$$\sin x = 1 \rightarrow y = 1$$

$$\sin x = -1 \rightarrow y = r$$

$$\sin x = \frac{1}{r} \rightarrow y = \frac{1}{r} - \frac{1}{r} + 1 = \frac{r}{r}$$

$$b) \sin^r x + \sin^r x + 1$$

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

$$\sin^r x = 0 \rightarrow y = 1$$

$$\sin^r x = 1 \rightarrow y = r$$

$$\sin^r x = \frac{1}{r} \rightarrow y = \frac{1}{r} + \frac{1}{r} + 1 = \frac{r}{r}$$

(2) 10

۳- مخرج کسر همواره مثبت است پس دامنه IR است

$$f(n) = \frac{(n - \frac{1}{r})^2}{(n - \frac{1}{r})^2 + \frac{r}{4}}$$

طرفین واصلین $\rightarrow y n^2 - y n + y = n^2 - n + \frac{1}{r} \rightarrow (y-1)n^2 - (y-1)n + y - \frac{1}{r} = 0$

$$n = \frac{y-1 \pm \sqrt{(y-1)^2 - 4(y-1)(y-\frac{1}{r})}}{2(y-1)} \rightarrow \Delta \geq 0 \rightarrow (y-1)(y-1-\cancel{4y}+1) \geq 0$$

$$\frac{0}{-} \mid \frac{1}{+} \Rightarrow y = [0, 1]$$

غیرب n بنایه صفر شود یعنی $y \neq 1$ است

و تابع در انزای هیچ قدری برابر یک نمیشه پس برد برابر است با: $R_y = [0, 1)$

می‌توانست از روش مربع هم استفاده کنی:

$$f(n) = \frac{\square^2}{\square^2 + \frac{r}{4}}$$