

$$\ominus \begin{cases} x \rightarrow x f(-x) - x^2 f(x) = r/n^2 + x \leftarrow \frac{x}{n} \\ -x \rightarrow f(x) + x f(-x) = r/n^2 + 1 \end{cases}$$

$$(-x^2 - 1) f(x) = r/n^2 - x - 1$$

$$f(x) = \frac{r/n^2 - x - 1}{-x^2 - 1}$$

$$x=0 \rightarrow r f(0) = 1 \rightarrow f(0) = \frac{1}{r}$$

$$x=n^2 \rightarrow f(n^2) + r = n^2 - r n^2 + 1 \rightarrow f(n^2) = n^2 - r n^2 + r$$

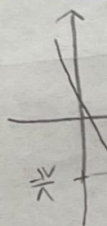
$$x^2 + (1-y)x + y + r = 0$$

$$\leftarrow yx - y = x^2 + x + r$$

$$\Delta \rightarrow \frac{y-1 \pm \sqrt{y^2-4y-4}}{2} \rightarrow y^2-4y-4 \geq 0$$

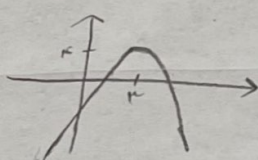
$$(y-2)^2 \geq 8 \rightarrow y-2 \geq \pm 2\sqrt{2} \rightarrow y \geq 2+2\sqrt{2} \text{ or } y \leq 2-2\sqrt{2}$$

الف)



$$R_f = [-\frac{1}{\sqrt{2}}, +\infty)$$

ب)



$$R_f = \sqrt{(-\infty, 4]} = [0, 2]$$

$$ج) \sqrt{R} = [0, +\infty) = R_f$$

$$د) R_f = \mathbb{R}$$

$$الف) r_{n+1} = rny - 4y \rightarrow (r-4y)x = -4y-1-x = \frac{-4y-1}{r-4y} \rightarrow R_f = \mathbb{R} - \left\{ \frac{r}{4} \right\}$$

$$ب) \sqrt{R - \{r\}} \rightarrow R_f = [0, +\infty) - \{r\}$$

$$ج) \sqrt{x^2 + 1} = a \rightarrow a + \frac{1}{a} \geq r \rightarrow R_f = \left[\frac{\sqrt{r}}{2} + \infty \right)$$

$$د) x^2 + \frac{1}{x^2} + r - r \rightarrow a + \frac{1}{a} - r \rightarrow R_f = \left[\frac{1}{r} + \infty \right)$$

$$\hookrightarrow r + \frac{1}{r} = \frac{16}{r} - \frac{14}{r} = \frac{2}{r}$$

موسسه مالی و اعتباری ثامن الحجج (ع)
(تحت نظارت بانک مرکزی)



تاریخ:

شماره:

پیوست:

$$\begin{aligned} x^2 - 4 &= 0 \rightarrow -\frac{4}{1} = -4 \\ x^2 &= 4 \rightarrow x = \pm 2 \\ x &= \infty \rightarrow \frac{\infty}{\infty} = 1 \rightarrow [2, +\infty) \end{aligned}$$

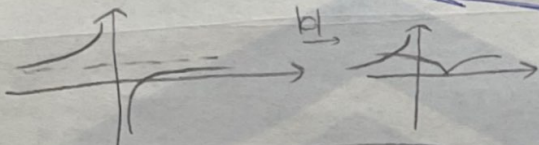
$$y^2 - y = 3x^2 + 4 \rightarrow (3-y)x^2 + y + 4 = 0 \rightarrow \Delta \geq 0 \rightarrow 0 + 14y - 48 \geq 0$$

$$y - 3 \geq 0 \rightarrow R_f = [3, +\infty)$$

$$\begin{aligned} \sin x = 1 &\rightarrow y = -3 \\ \sin x = -1 &\rightarrow y = -\frac{1}{3} \end{aligned}$$

$$R_f = [-3, -\frac{1}{3}]$$

الف)

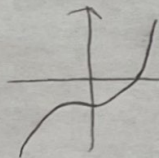


$$R_f = [0, +\infty)$$

ب)

$$\frac{9(x-2)}{4(x-2)} = R_f = \left\{\frac{9}{4}\right\}$$

$$\frac{-x^2 - 2x}{x^2 - 2x}$$



$$R_f = \mathbb{R}$$

$$f(1-m) + 1$$

$$y = |f(1-m) + 1|$$

