

$$f(x) = r \sin\left(\frac{\pi}{r}x + \frac{\pi}{r}\right) - 1 \quad \begin{matrix} \sin x = 0 \rightarrow f(x) = -1 \\ \sin x = 1 \rightarrow f(x) = 1 \end{matrix}$$

$$R_f = [-1, 1]$$

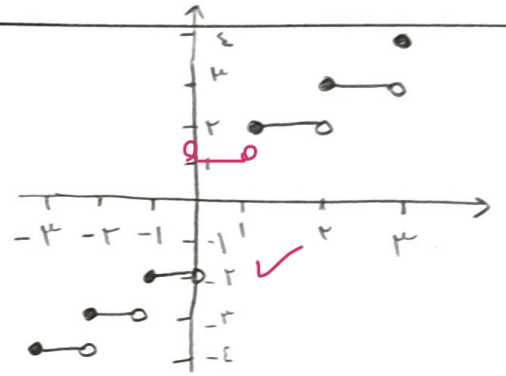
(1) (2)

$$g(x) = r \cos^2 x - 2 \quad \begin{matrix} \cos x = -1 \rightarrow f(x) = -1 \\ \cos x = 1 \rightarrow f(x) = -1 \end{matrix}$$

$$R_f = [-1, -1]$$

$$y = \frac{x}{|x|} + [x]$$

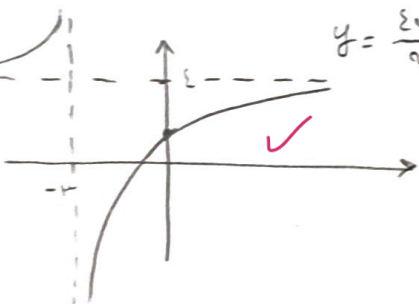
$$\Rightarrow \begin{matrix} -3 \leq x < -2 \rightarrow -1 - 3 = -4 \\ -2 \leq x < -1 \rightarrow -1 - 2 = -3 \\ -1 \leq x < 0 \rightarrow -1 - 1 = -2 \\ 0 \leq x < 1 \rightarrow -1 + 1 = 0 \\ 1 \leq x < 2 \rightarrow -1 + 2 = 1 \\ 2 \leq x < 3 \rightarrow -1 + 3 = 2 \\ x = 3 \rightarrow 2 \end{matrix}$$



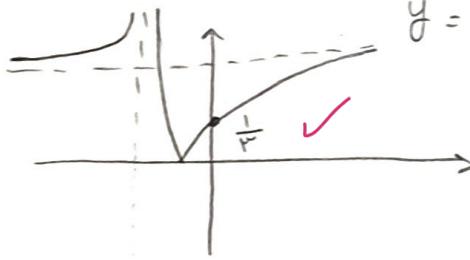
(2) (3)

$$y = \left| \frac{x+1}{x+3} \right| \rightarrow \text{تابع قدر مطلق}$$

(2) (3)



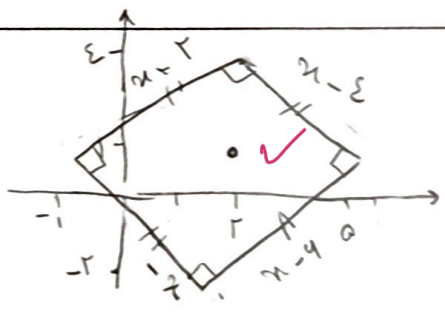
$$y = \frac{x+1}{x+3}$$



$$y = \left| \frac{x+1}{x+3} \right|$$

$$\begin{matrix} x > 2, y > 1 \rightarrow x - 2 + y - 1 = 1 \rightarrow y = -x + 4 \\ x > 2, y < 1 \rightarrow x - 2 - y + 1 = 1 \rightarrow y = x - 2 \\ x < 2, y > 1 \rightarrow -x + 2 + y - 1 = 1 \rightarrow y = x + 2 \\ x < 2, y < 1 \rightarrow -x + 2 - y + 1 = 1 \rightarrow y = -x \end{matrix}$$

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



(2) (4)

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

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

(5)

$$\min_i = 2 + \sqrt{2} \rightarrow R_f = [2 + \sqrt{2}, +\infty)$$

دانشگاه دلیل وجود این سوال تنها (1, 2, 3, 4, 5) قابل قبول است.

(1, 2, 3, 4, 5)

$$y = (\sin^2 x - \sin x)(1 + \sin x) = -\sin^2 x + \sin x + 1 \quad R_f = [0, 1]$$

$$\begin{matrix} \sin x = 1 \rightarrow 1 \\ \sin x = -1 \rightarrow 0 \end{matrix}$$

صفحه آخر...

$$D_f \in \mathbb{N} \rightarrow D_f = \{1, 2, \dots, 9\}$$

$$x=1 \rightarrow -\frac{1}{1} + 1.$$

$$x=4 \rightarrow -\frac{4}{4} + 1.$$

$$x=2 \rightarrow -\frac{2}{2} + 1.$$

$$x=5 \rightarrow -\frac{5}{5} + 1.$$

$$x=3 \rightarrow -\frac{3}{3} + 1.$$

$$x=8 \rightarrow -\frac{8}{8} + 1.$$

$$x=6 \rightarrow -\frac{6}{6} + 1.$$

$$x=9 \rightarrow -\frac{9}{9} + 1.$$

$$x=7 \rightarrow -\frac{7}{7} + 1.$$

$$\text{مجموعه } \{x^k\} = -\frac{\sum \omega}{\mu} + 9. = -10 + 9. = -1 \quad (2) \quad (6)$$

$$\downarrow$$

$$\left(-\frac{1}{\mu} + 1.\right) + \left(-\frac{2}{\mu} + 1.\right) + \dots + \left(-\frac{9}{\mu} + 1.\right) = -10$$

$$f(m) = \sqrt{am^2 + bm + c} \Rightarrow f(m) = \sqrt{x-1} \rightarrow b=1, c=-1$$

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

$$\hookrightarrow a=0 \quad \sqrt{2m+1} = f(1) = 1 \quad \text{OK}$$

$$g(m) = \sqrt{x^2 + 2} \rightarrow R_g = (1, +\infty)$$

$$f(m) = \frac{n(n^2-2)}{n+2} = \frac{n(n-2)(n+2)}{n+2} = n^2 - 2n \quad \min = -\frac{\Delta}{2a} = -1 \rightarrow R_f = (-1, +\infty) - \{n\} \quad (2) \quad (8)$$

$$D_f = \mathbb{R} - \{-1, 2\} \quad (2)$$

$$f\left(\frac{a+b}{2}\right) = f(-1) \rightarrow f(-1) = -1$$

$$1 \neq n(n-2) \rightarrow b \rightarrow 2$$

$$2 \neq n(n-2) \rightarrow a \rightarrow -2$$

$$y = \sqrt[3]{x^3 + am^2 + bm - 1} \rightarrow \sqrt[3]{(x-2)^3} \rightarrow \sqrt[3]{x^3 - 4x^2 + 11x - 8} \rightarrow a=-4, b=11 \quad (2) \quad (9)$$

این یک تابع پاره‌ای است
یعنی در یک بازه تعریف شده است.

$$\boxed{y = x-2} \rightarrow \text{خط}$$

$$D_f = [-4, 12] \rightarrow R_f = [-1, 1]$$

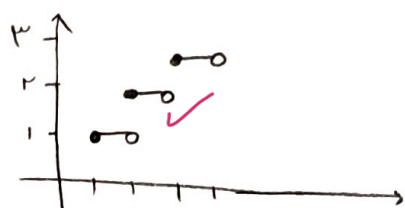
$$x=-4 \rightarrow y = -4-2 = -6$$

$$x=12 \rightarrow y = 12-2 = 10$$

$$y = [x] + \left[x + \frac{1}{x}\right] \quad D_f = \left[\frac{1}{x}, 2\right] \rightarrow \frac{1}{x} \leq x < 1 \rightarrow y=1$$

$$1 \leq x < \frac{2}{x} \rightarrow y=2$$

$$\frac{2}{x} \leq x < 2 \rightarrow y=2$$



این تابع پاره‌ای است
یعنی در یک بازه تعریف شده است.

الف) $f(x) = x + \frac{1}{x} + r \sqrt{x + \frac{1}{x}}$

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$\left\{ \begin{array}{l} \min \square = \sqrt{r} \rightarrow f(x) = r + r\sqrt{r} \\ \max \square \sim \infty \rightarrow f(x) = +\infty \end{array} \right.$

$\square = -\frac{b}{r_a} = -1 \quad x$

$\Rightarrow R_f = [r + r\sqrt{r}, +\infty)$