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موضوع: کتب: ۱

$$\text{الف) } f(n) = 2 \sin^2\left(n + \frac{\pi}{2}\right) - 1 \rightarrow -1 \leq \sin\left(n + \frac{\pi}{2}\right) \leq 1 \rightarrow \textcircled{1}$$

$$0 \leq 2 \sin^2\left(n + \frac{\pi}{2}\right) \leq 2 \rightarrow -1 \leq 2 \sin^2\left(n + \frac{\pi}{2}\right) - 1 \leq 1$$

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

$$\text{ب) } g(n) = 3 \cos^3 n - 4 \rightarrow -1 \leq \cos n \leq 1 \rightarrow -3 \leq 3 \cos^3 n \leq 3 \rightarrow$$

$$-7 \leq 3 \cos^3 n - 4 \leq -1 \rightarrow R_g = [-7, -1]$$

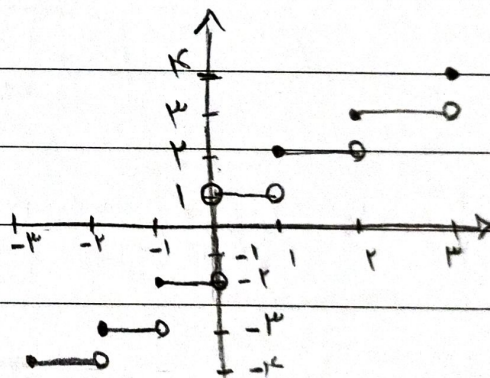
$$y = \frac{n}{|n|} + [n] \rightarrow n \neq 0 \textcircled{2}$$

$$-3 \leq n < -1: -1 - 3 = -4 \quad 1 \leq n < 2: 1 + 1 = 2$$

$$-2 \leq n < -1: -1 - 2 = -3 \quad 2 \leq n < 3: 1 + 2 = 3$$

$$-1 \leq n < 0: -1 - 1 = -2 \quad n = 3: 1 + 3 = 4$$

$$0 \leq n < 1: 1 + 0 = 1$$



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

$$n = 0 \rightarrow y = \frac{1}{3}$$

$$y = \frac{k n + 1}{n + 3} \textcircled{1}$$

$$\textcircled{2} y = \left| \frac{k n + 1}{n + 3} \right|$$

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$$|m-r| + |y-1| = r \rightarrow \text{مربع}$$

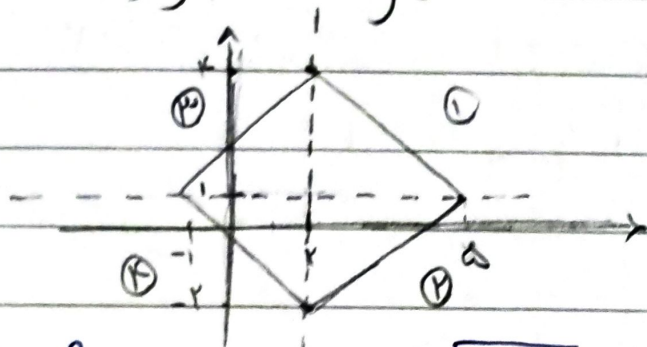
(K)

$$\textcircled{1} m \geq r, y \geq 1 \rightarrow y = -m + r$$

$$\textcircled{3} m \leq r, y \geq 1 \rightarrow y \leq m + r$$

$$\textcircled{2} m \geq r, y \leq 1 \rightarrow y \leq m - r$$

$$\textcircled{4} m \leq r, y \leq 1 \rightarrow y \geq -m$$



$$\text{الف) } f(m) = m + \frac{1}{m} + r\sqrt{m+1} \rightarrow m + \frac{1}{m} \geq 0 \text{ و } m \geq 0 \rightarrow$$

(a)

$$m + \frac{1}{m} \geq r$$

$$\left(\sqrt{m + \frac{1}{m}}\right)^r + r\sqrt{m+1}$$

$$\xrightarrow{\frac{r}{m}} \sqrt{m+1} \begin{cases} \xrightarrow{+\infty} +\infty \\ \xrightarrow{-\frac{1}{r}} -1 \end{cases} \rightarrow R_f = [r + r\sqrt{r}, +\infty)$$

$$f(m) = -\frac{1}{r}m + b \quad D_f = \{1, r, r^2, \dots, r^q\} \rightarrow$$

(4)

$$R_f = \left\{ \frac{r^1}{r}, \frac{r^2}{r}, \frac{r^3}{r}, \dots, \frac{r^q}{r} \right\} \quad \frac{r^q}{r} + \frac{r^1}{r} \times q = Va$$

$$\text{ب) } y = (r - \sin m)(1 + \sin m) =$$

سواله (مستأب):

$$-\sin^2 m + r \sin m + r \rightarrow \sin m \begin{cases} \xrightarrow{0} 0 \\ \xrightarrow{+1} r \end{cases} \rightarrow R_f = [0, r]$$

$$f(m) = \sqrt{am^2 + bm + c} \rightarrow \text{مربع} \rightarrow a = 0,$$

(v)

$$1 = \sqrt{rb + c}, \quad g(m) = \sqrt{bm^2 - rc} \rightarrow \sqrt{m^2 + r} \rightarrow m^2 + r \geq r \rightarrow$$

$$bm + c \geq 0 \xrightarrow{m \geq r} rb + c = 0$$

$$\sqrt{m^2 + r} \geq r \rightarrow$$

$$rb + c = 1 \rightarrow b = 1, c = -r$$

$$R_g = [r, +\infty)$$

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$$f(m) = \frac{m^2 - r m}{m+r} = \frac{m(m-r)(m+r)}{m+r} = m(m-r) \quad \text{①}$$

$m+r \rightarrow m \neq -r$ ①

$$m \sim m(m-r) \neq 1 \rightarrow m \neq r \sim \{a, b\} = \{-r, r\}$$

$$\rightarrow ar - rm \rightarrow 1 - r = -1 \sim C = -1$$

$m = -\frac{b}{a} = 1$

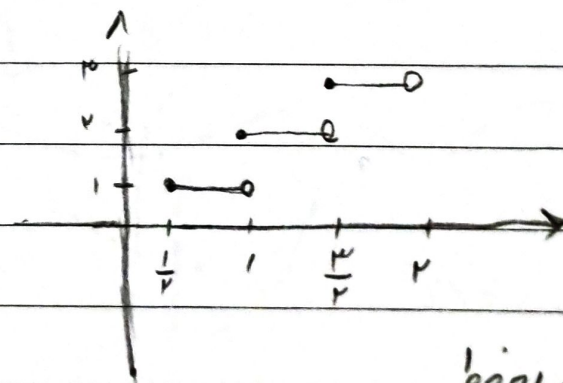
$$f\left(\frac{a+b}{rc}\right) = f(-1) = -1(-1-r) = r$$

$$y = \sqrt[m^2+am+b]{m-1} \xrightarrow{\text{der}} \sqrt{(m-r)^2} = m-r \quad \text{②}$$

$$(m-r)^2 \leq m^2 + 11m - 4m^2 - 1 \rightarrow a = -4, b = 11$$

$$Dy \in [-4, 11] \rightarrow -4 \leq m \leq 11 \rightarrow -1 \leq m-r \leq 1 \rightarrow R_f = [-1, 1]$$

$$y \in \left[n + \frac{1}{r}\right]$$



$$\frac{1}{r} < n < 1 \rightarrow y = 1$$

$$1 < n < \frac{1}{r} \rightarrow y = 1 + \frac{1}{r}$$

$$\frac{1}{r} < n < r \rightarrow y = 1 + r$$

beispiel