

$$f(x) = \sqrt{1-x^2} \quad g = \{(-1, 1), (0, 4), (2, 0), (1, 2)\}$$

$$1-x^2 \geq 0 \Rightarrow 1 \geq x^2 \Rightarrow 1 \geq x \geq -1$$

$$\Rightarrow f \cdot g = \{(-1, 2), (1, 4), (0, 5)\} \Rightarrow \omega + f + g = 11 \checkmark$$

(۲)

۱

$$f(x) = |x-1| \quad P_f = [1, +\infty) \xrightarrow[\alpha > 0]{f(\alpha) = \omega} R_f = [\omega, +\infty)$$

$$g(x) = \frac{1}{x} x + 3 \rightarrow P_g = (-\infty, 3] \xrightarrow[\alpha > 0]{g(\alpha) = f} R_g = (-\infty, 4]$$

$$R_f \cup R_g = (-\infty, 4] \cup [\omega, +\infty) \checkmark$$

(۲)

۲

$y = \frac{-x^2}{p} + x + 3 \xrightarrow{p} R_f = (a, b) \xrightarrow{p} \sqrt{b-a} = ?$

$\text{بازه } (a, b) \text{ مال طریقه}$

$\text{است! } \rightarrow -1 < x < 3 \rightarrow a = -1, b = 3 \rightarrow \sqrt{b-a} = \sqrt{4} = 2$

$y_{\max} = \frac{-b}{2a} = \frac{-1}{-1} = 1$

$y_{\max} = -\frac{1}{p}(1) + 1 + 3 = -\frac{1}{p} + 4 = 3, \omega = \frac{1}{p}$

$(a, b) \rightarrow (\frac{3}{p}, \frac{1}{p}) \quad a = \frac{3}{p}, b = \frac{1}{p}$

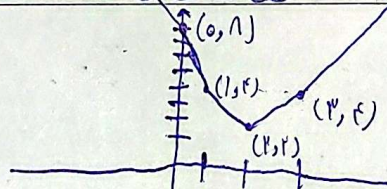
$\sqrt{b-a} = \sqrt{\frac{1}{p} - \frac{3}{p}} = \sqrt{\frac{-2}{p}} = \sqrt{2}$

۵

۳

$$y = |x-1| + |x-3| + |2x-4|$$

$$y = \begin{cases} x-1 & : x \geq 3 \\ 2x-2 & : 2 \leq x \leq 3 \\ -x+3 & : 1 \leq x \leq 2 \\ -x+1 & : x \leq 1 \end{cases} \Rightarrow$$



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

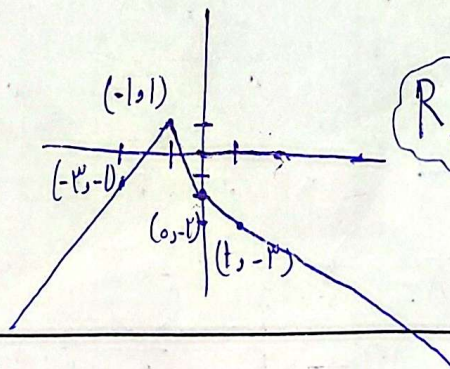
$\Rightarrow \text{مقدار} = 2$

(۲)

۴

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

$$y = \begin{cases} -x-2 & : x \geq 0 \\ -3x-2 & : -1 \leq x \leq 0 \\ x+2 & : x \leq -1 \end{cases} \Rightarrow$$



$$R_f = (-\infty, 1] \checkmark$$

(۲)

۵

$$y = \frac{x^2 + \omega x + m}{x+1} \quad R_f = \mathbb{R}$$

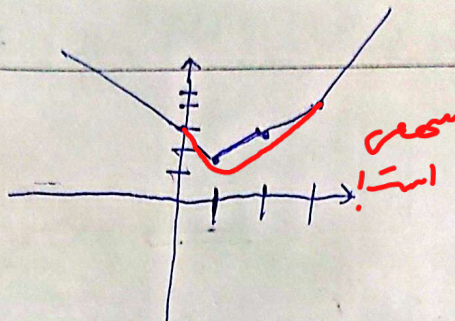
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$$y(x+1) = x^2 + \omega x + m \Rightarrow x^2 + (\omega - y)x + (m - y) = 0 \Rightarrow (\omega - y)^2 - 4(m - y) = y^2 - 2y + (\omega^2 - 4m)$$

$$\Rightarrow y^2 - 2y + (\omega^2 - 4m) \geq 0 \xrightarrow{\Delta \geq 0} (-1)^2 - 4(\omega^2 - 4m) = 1 - 4\omega^2 + 16m = 16m - 4\omega^2 \geq 0$$

$$\Rightarrow m \geq \frac{\omega^2}{4} \Rightarrow m \geq \frac{1}{4} \checkmark$$

$$f(x) = \begin{cases} x+1; & x \geq 1 \\ x^2 - 2x + 1; & 0 \leq x < 1 \\ |x|+1; & x < 0 \end{cases}$$

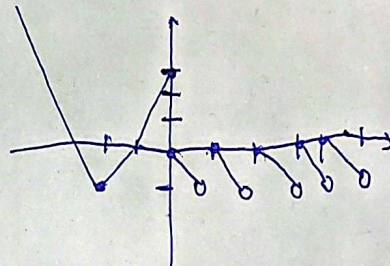


(2)

7

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

$$f(x) = \begin{cases} x^2 + (x+1)^2; & x \leq 0 \rightarrow (x+1)^2 - 1 \\ [(x) - 1]^2; & x > 0 \end{cases}$$



(2)

8

$$R_f = [-1, +\infty) \checkmark$$

$$y = a + 1 - \sqrt{2x+1} \quad D_f = [b, +\infty) \quad R_f = (-\infty, a] \quad ab = ?$$

$$2x+1 \geq 0 \Rightarrow x \geq -\frac{1}{2} \Rightarrow b = -\frac{1}{2} \checkmark \quad y_{\max} = a + 1 - 0 = a + 1$$

$$R_f = (-\infty, a+1] \Rightarrow a+1 = \omega \Rightarrow a = \omega - 1 \checkmark \quad a \times b = f\left(-\frac{1}{2}\right) = -\frac{1}{2} \checkmark$$

(2)

9

$$f(x) = 1 - \sqrt{x+1} + 1 - \sqrt{1-x} \quad f(x) + g(x) = 2 - \sqrt{1+x} - \sqrt{1-x} \quad D_f = D_g$$

$$y = \frac{f(x)}{g} - \frac{g(x)}{1} \rightarrow R_y = ? \quad 2 - \sqrt{1+x} - \sqrt{1-x} = 2 - (\sqrt{1+x} + \sqrt{1-x})$$

$$g(x) = 2 - (\sqrt{1+x} + \sqrt{1-x}) - f(x) = (2-1)\sqrt{1+x} + (2-1)\sqrt{1-x} = \sqrt{1+x} + \sqrt{1-x}$$

$$\frac{f}{g} = \frac{1}{\sqrt{1+x} + \sqrt{1-x}} \Rightarrow \frac{f}{g} = \left(\frac{1}{\sqrt{1+x} + \sqrt{1-x}} \right) - \left(\frac{1}{\sqrt{1+x} + \sqrt{1-x}} \right)$$

$$= \sqrt{1-x} \Rightarrow D_y = [-1, 1] \Rightarrow R_y = [0, \sqrt{2}] \checkmark$$

(2)

10