

$f(x) = \sqrt{1-x^2} \xrightarrow{D_f} 1-x^2 \geq 0 \rightarrow x^2 \leq 1 \rightarrow -1 \leq x \leq 1$
 $g(x) = \begin{cases} (-1, 1) & (0, 4) & (1, 0) & (1, 2) \end{cases} \xrightarrow{D_g} \{-1, 0, 2, 1\} \xrightarrow{D_g \cap D_f} \{-1, 0, +1\}$
 $2g - 3f = ?$
 $2g = \begin{cases} (-1, 2) & (0, 8) & (1, 4) \end{cases} \Rightarrow 2g - 3f = \begin{cases} (-1, 2-0) & (0, 8-3) & (1, 4-0) \end{cases}$
 $3f = \begin{cases} (-1, 0) & (0, 3) & (1, 0) \end{cases} \Rightarrow 2g - 3f = \begin{cases} (-1, 2) & (0, 5) & (1, 4) \end{cases}$
 $\Rightarrow \text{مجموع} \Rightarrow (2+5+4) = 11 \checkmark$

$f(x) = 2x-1 \xrightarrow{D_f} [3, +\infty) \xrightarrow{\text{رسم خط}} 2x-1 \Rightarrow$
 $g(x) = \frac{1}{2}x+3 \xrightarrow{D_g} (-\infty, 3]$
 $R_f \cup R_g = ?$
 $\Rightarrow \begin{cases} R_f(x) \xrightarrow{[3, +\infty)} [5, +\infty) \\ R_g(x) \xrightarrow{(-\infty, 3]} (-\infty, 4] \end{cases} \Rightarrow R_f \cup R_g = (-\infty, 4] \cup [5, +\infty) \checkmark$

$y = \frac{-x^2}{2} + x + 3 \rightarrow y = -\frac{1}{2}x^2 + x + 3 \rightarrow \left| -\frac{b}{2a} = +1 \right.$
 $y = -\frac{1}{2}(1) + 1 + 3 = 3.5$
 $R_y(a, b) > \frac{3}{2}$
 $\max \sqrt{b-a} = ?$
 $y_a = 3.5 \rightarrow x = 1$
 $y_b = 1.5 \rightarrow x = -1$
 $\Rightarrow -\frac{1}{2}x^2 + x + 1.5 = 0 \rightarrow x \in [-1, 3] \xrightarrow{\text{max value}} \sqrt{3-(-1)} = \sqrt{4} = 2 \checkmark$

$y_{\min} = |x-1| + |x-3| + |2x-4| = ?$
 $\Rightarrow$

$-x+1-2x+6-4x+8 = -7x+15$	$x-1+3-x-6+4 = -4$	$x-1-2x+6+4x-8 = 3x-3$	$x-1+x-3+4x-8 = 6x-12$
$-7x+15$	-4	$3x-3$	$6x-12$
(F)	(T)	(F)	(F)

 $\Rightarrow y_{\min} = 4 \checkmark$

$y = |x| - 2|x+1| \xrightarrow{\text{رسم خط}} \begin{cases} x=0 \\ x=-1 \end{cases}$
 $R_y = ?$

$-x+2x+2 = x+2$	$-x-2x+2 = -3x+2$	$+x-2x-2 = -x-2$
$x+2$	$-3x+2$	$-x-2$
(T)	(F)	(F)

 $\Rightarrow R_y = (-\infty, 2] \checkmark$

آنه $m = 4$ باشد 3 از بزرگترین مقادیر
 دین ۱۲ نیست پس $\{1, 2, 3\} m = 4$
 سوال ۶

$$y = \frac{x^2 - \alpha x + m}{x+1} \xrightarrow{\text{تقسیم}} y(x+y) = x^2 - \alpha x + m \xrightarrow{\text{تقسیم}} x^2 - \alpha x + m - yx - y = 0$$

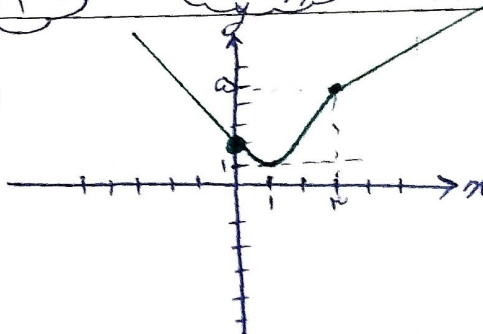
$$R_y = \mathbb{R} \Rightarrow x^2 + (-\alpha - y)x + m - y \xrightarrow{\text{تقسیم}} x = \frac{\alpha + y \pm \sqrt{(\alpha + y)^2 + 4y - 4m - 4y}}{2}$$

$$x = \frac{\alpha + y \pm \sqrt{y^2 + 4y + \alpha^2 - 4m}}{2} \Rightarrow \sqrt{y^2 + 4y + \alpha^2 - 4m} \geq 0 \Rightarrow y = \frac{-4 \pm \sqrt{16 - 100 + 19m}}{2}$$

$$\Delta = 0 \cup \Delta < 0 \leftarrow \text{باید } \Delta \geq 0 \text{ باشد} \Rightarrow -4 \pm \sqrt{16 - 100 + 19m} \Rightarrow -4 + \sqrt{16 - 100 + 19m} \leq 0 \Rightarrow 19m \leq 44 \Rightarrow m \leq \frac{44}{19} \Rightarrow 1, 2, 3, 4$$

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

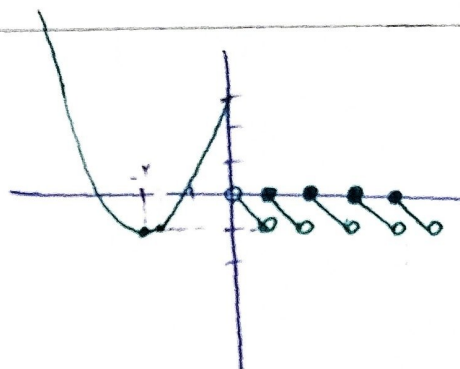
استفاده از رسم گراف



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

$$f(x) = \begin{cases} x^2 + 4x + 2 & \text{if } x \leq 0 \\ [x] - 2x & \text{if } x > 0 \end{cases}$$

استفاده از رسم گراف



$$\hookrightarrow \text{مجموعه } [0] - 0$$

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

$$y = a + 1 - \sqrt{2x + 3} \rightarrow \begin{cases} D_f = [b, +\infty) \\ R_y = (-\infty, \omega] \end{cases} \xrightarrow{\text{تقسیم}} a + 1 - \sqrt{2x + 3} \xrightarrow{\text{تقسیم}} \omega \geq 0 \quad 2x + 3 \geq 0 \quad x \geq -\frac{3}{2}$$

$$ab = 9$$

استفاده از رسم گراف

$$D_f = [-\frac{3}{2}, +\infty)$$

$$b = -\frac{3}{2} \checkmark$$

$$y = a + 1 - \sqrt{2x + 3} \rightarrow -\sqrt{2x + 3} = -\sqrt{0} \rightarrow \text{تغییر} \rightarrow R_y = (-\infty, \omega]$$

$$y = a + 1 - \sqrt{2x + 3} \xrightarrow{\text{تقسیم}} a + 1 = \omega \rightarrow a = 4 \checkmark \Rightarrow ab = 4(-\frac{3}{2}) = -6 \checkmark$$

$$f(x) = 2\sqrt{x+1} + 4\sqrt{1-x} \xrightarrow{\text{تقسیم}} \xrightarrow{\text{تقسیم}} -1 \rightarrow f(-1) = 4\sqrt{2}$$

$$f(1) = 2\sqrt{2} \quad f(1) + g(1) = 2\sqrt{2} \rightarrow 2\sqrt{2} + g(1) = 2\sqrt{2} \rightarrow g(1) = 0$$

$$D_f = D_g \quad f(-1) + g(-1) = 2\sqrt{2} \rightarrow 4\sqrt{2} + g(-1) = 2\sqrt{2} \rightarrow g(-1) = -2\sqrt{2}$$

$$R_y = \frac{f(x)}{4} - \frac{g(x)}{3} \rightarrow \text{تقسیم} \rightarrow \frac{f(1)}{4} - \frac{g(1)}{3} = \frac{2\sqrt{2}}{4} - \frac{0}{3} = \frac{\sqrt{2}}{2}$$

$$\Rightarrow R_f = [0, \sqrt{2}] \checkmark$$