

$f(x) = \sqrt{1-x^2} \rightarrow 1-x^2 \geq 0 \Rightarrow x^2 \leq 1 \Rightarrow -1 \leq x \leq 1 \Rightarrow D_f = [-1, 1]$
 $g = \{(-1, 1), (0, 2), (1, 0), (1, 2)\} \Rightarrow D_g = \{-1, 0, 1, 2\}$
 $\cap \Rightarrow \{-1, 0, 1\}$

$f(1) = 0, g(1) = 2 \Rightarrow (2g - 3f)(1) = 2$
 $f(0) = 1, g(0) = 2 \Rightarrow (2g - 3f)(0) = 0$
 $f(-1) = 0, g(-1) = 1 \Rightarrow (2g - 3f)(-1) = 2$

$\Rightarrow 2g - 3f = 2, 0, 2 \Rightarrow 2g - 3f = 2$

$f(x) = 2x - 1$
 $D_f = [2, +\infty)$

$g(x) = \frac{1}{x} x, 3$
 $D_g = (-\infty, 3]$

$\Rightarrow R_f = [5, +\infty)$
 $\Rightarrow R_g = (-\infty, 2]$
 $\Rightarrow (-\infty, 2] \cup [5, +\infty)$

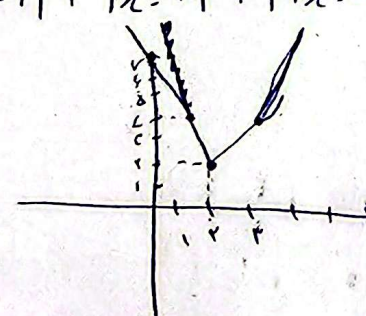
$y = \frac{-x^2}{2} + x + 3$
 $(a, b) \rightarrow (I)$

$\frac{-x^2}{2} + x + 3 > \frac{3}{2} \Rightarrow \frac{-x^2}{2} + x + \frac{3}{2} > 0$
 $\Rightarrow -x^2 + 2x + 3 > 0 \Rightarrow (x+1)(-x+3) > 0$

$\Rightarrow a = -1, b = 3$
 $\sqrt{b-a} = \sqrt{3-(-1)} = \sqrt{4} = 2$

$(-1, 3)$

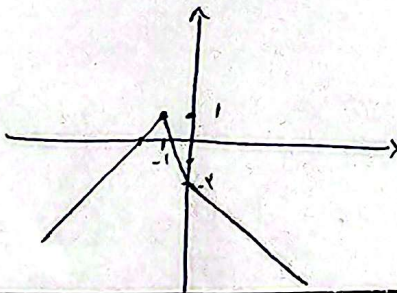
$y = |x-1| + |x-3| + |2x-4|$



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

$\text{کمترین مقدار} = 2$

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



	-1	0
x	x	x
$-2 x+1 $	$-2x-2$	$-2x$
y	$-x-2$	$-x$

$R_y = (-\infty, 1]$

$$y = \frac{x^2 + \omega x + m}{x+1} \Rightarrow xy + y = x^2 + \omega x + m \Rightarrow x^2 + (\omega - y)x + (m - y) = 0$$

$$\Rightarrow x = \frac{y - \omega \pm \sqrt{y^2 - 1 \cdot y + 2y + \omega y - \omega m}}{2} \rightarrow y^2 - 4y + 2\omega - \omega m \geq 0$$

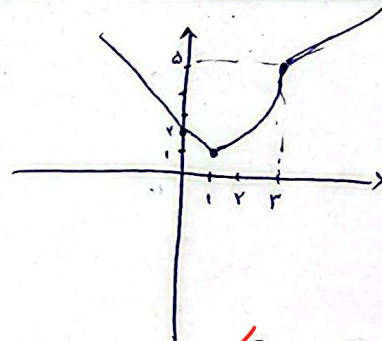
ان $m = 4$ باشد از بد حذف می‌شود
دیده R نیست پس $\{1, 2, 3\}$ $m = 0, 1, 2, 3$

$$\Rightarrow 34 - 100 + 14m \leq 0 \Rightarrow 14m - 66 \leq 0$$

$$\Rightarrow m \leq \frac{66}{14} \Rightarrow m \in \mathbb{N} \Rightarrow m = \{1, 2, 3, 4\}$$

ω مقدار طبیعی برای m وجود دارد

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



$$y = x^2 - 2x + 2 \Rightarrow x_1 = \frac{-b}{2a} = -\frac{-2}{2} = 1$$

$$y_1 = 1 - 2 + 2 = 1$$

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

$$f(x) = \begin{cases} x^2 + 2x + 3 & ; x \leq 0 \\ [2x] - 2x & ; x > 0 \end{cases}$$

$$\Rightarrow y_1 = [a] - a \Rightarrow R_{y_1} = (-1, 0]$$

$$y_1 = x^2 + 2x + 3 \Rightarrow x_1 = \frac{-b}{2a} = -\frac{2}{2} = -1$$

$$y_1 = 1 - 2 + 3 = 2$$

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

$$y = a+1 - \sqrt{2x+3} \Rightarrow 2x+3 \geq 0 \Rightarrow x \geq -\frac{3}{2} \Rightarrow D_y = [-\frac{3}{2}, +\infty)$$

$$D_y = [b, +\infty)$$

$$R_y = (-\infty, a]$$

$$-\infty < a+1 - \sqrt{2x+3} \leq a+1$$

$$ab = 2x - \frac{3}{2} = -6 \checkmark$$

$$R_y = (-\infty, a+1] \Rightarrow a+1 = a = 2 \checkmark$$

$$x_1 \geq 0 \Rightarrow x_1 \geq -1$$

$$f(x) = 2\sqrt{x+1} + 2\sqrt{1-x} \Rightarrow D_f = [-1, 1] = D_g = D_y$$

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

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

$$= \sqrt{2+2\sqrt{1-x^2}} = \sqrt{x+1} + \sqrt{1-x} - \sqrt{(\sqrt{1-x} + \sqrt{1+x})^2} = \sqrt{x+1} + \sqrt{1-x} - |\sqrt{1-x} + \sqrt{1+x}|$$

$$= 2\sqrt{1-x} - \sqrt{1-x} = \sqrt{1-x}$$

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