

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

$$-x^2 + 1 \geq 0 \rightarrow x^2 \leq 1 \rightarrow -1 \leq x \leq 1 \rightarrow D_f \cap D_g = \{-1, 0, 1\}$$

$$f_g - f_f = 8 \rightarrow \{(-1, 2), (0, 4), (1, 4)\} \rightarrow R = \{2, 4, 4\}$$

$$2 + 4 + 4 = 11$$

(1)

$$\left. \begin{array}{l} R_f = [4, +\infty) \\ R_g = (-\infty, 4] \end{array} \right\} \xrightarrow{U} R = (4, 4)$$

(2)

$$y = -\frac{x^2}{4} + x + 3 \quad \left| \begin{array}{l} -\frac{b}{2a} = \frac{-1}{-1} = 1 \\ \frac{4}{4} \end{array} \right. \quad R = (-\infty, \frac{1}{2}]$$

$$(a, b) \rightarrow (\frac{1}{4}, \frac{1}{4}) \rightarrow \sqrt{\frac{1}{4} - \frac{1}{4}} = \sqrt{0} = 0$$

(3)

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

$x=1 \quad x=2 \quad x=3$

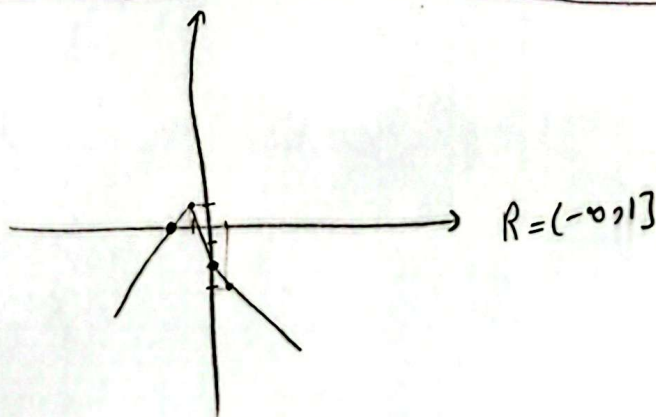
	1	2	3
$-x+1$	$x-1$	$-x+2$	$x-3$
$-x+2$	$x-1$	$-x+2$	$x-3$
$-x+3$	$x-1$	$x-2$	$-x+3$
$-x+4$	$x-1$	$x-2$	$x-3$

کمترین قدر این تابع ۲ است

(4)

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

$x=0 \quad x=-1$

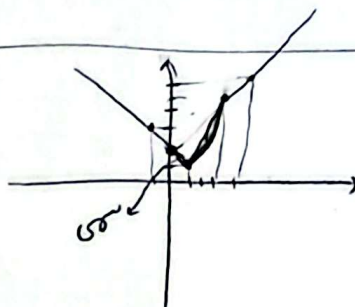


(5)

در این مسئله از روش جداسازی متغیرها استفاده می‌کنیم. ابتدا باید معادله را به فرم $y' = f(x)g(y)$ درآوریم. در اینجا داریم:

(۶)

$$f(x) = \begin{cases} x+2 & x > 2 \\ x^2-2x+2 & 0 < x \leq 2 \\ |x|+2 & x \leq 0 \end{cases} \quad \left| \frac{-b}{2a} = 1 \right.$$



$$R = [2, +\infty)$$

(۷)

$$f(x) = \begin{cases} x^2+2x+2 & x \leq 0 \rightarrow [-1, +\infty) = R \rightarrow \left| \frac{-b}{2a} = -1 \right. \\ [2x] - 2x & x > 0 \rightarrow [-1, 0] = R \\ \end{cases}$$

$$\hookrightarrow -1 \leq [2x] - 2x \leq 0$$

$$R = [-1, +\infty)$$

(۸)

$$y = a+1 - \sqrt{2x+3} \quad 2x+3 \leq 0 \rightarrow 2x \leq -3 \rightarrow x \leq -\frac{3}{2} \rightarrow D = R - \{x \mid x < -\frac{3}{2}\} \rightarrow b = -\frac{3}{2}$$

$$D = [b, +\infty) \quad x = b, y = 0 \rightarrow a+1 - \sqrt{2(-\frac{3}{2})+3} = 0 \rightarrow a = -1$$

$$R = (-\infty, 4] \quad a \times b = (-1) \times (-\frac{3}{2}) = \frac{3}{2}$$

(۹)

$$g(x) = 2\sqrt{2+2\sqrt{1-x^2}} - 2\sqrt{x+1} - 4\sqrt{1-x}$$

$$\frac{f(x) - 2g(x)}{4} = \frac{2\sqrt{x+1} + 4\sqrt{1-x} - 2\sqrt{2+2\sqrt{1-x^2}} + 2\sqrt{x+1} + 4\sqrt{1-x}}{4} =$$

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

$$= -(\sqrt{x+1} + \sqrt{1-x}) + \sqrt{x+1} + 2\sqrt{1-x} = \sqrt{1-x} \Rightarrow R = [0, \sqrt{2}]$$

(۱۰)