

یازدهم فصل

تکلیف ۱۸

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بسیار ساده تری

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

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$$g(x) = \{(-1, 1), (0, 1), (1, 0), (1, 1)\}$$

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$$fg - f^2 = ?$$

$$fg = \{(-1, 1), (0, 1), (1, 0), (1, 1)\}$$

برای نوشتن اعضای $f^2(x)$ لازم است اول تابع f را بنویسیم و g را بنویسیم

$$f^2 = \{(-1, 0), (0, 1), (1, 0)\}$$

$$fg - f^2 = \{(-1, 1), (0, 1), (1, 1)\}$$

$$1 + 0 + 1 = 1$$

$$f(x) = x - 1$$

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$$D_f = [1, +\infty) \rightarrow x = 1 \rightarrow y = 0 \rightarrow R_f = [0, +\infty)$$

$$g(x) = \frac{1}{x} + 1$$

$$\rightarrow x = 1 \rightarrow y = 2 \rightarrow R_g = (-\infty, 2]$$

$$D_g = (-\infty, 1]$$

$$R_f \cup R_g = (-\infty, 2] \cup [0, +\infty)$$

$$y = -\frac{1}{x} + x + 1 \rightarrow -\frac{1}{x} + x + 1 > \frac{1}{x}$$

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$$\begin{array}{c|c|c} -1 & 1 & \\ \hline + & - & + \end{array}$$

$$-\frac{1}{x} + x + 1 > 0$$

$$-x^2 + x + 1 > 0 \rightarrow x^2 - x - 1 < 0$$

$$(a, b) \rightarrow (-1, 1)$$

$$(x-1)(x+1) < 0$$

$$\sqrt{b-a} = \sqrt{r - (-1)} = \underline{r}$$

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

(5) (E)

$x < 1$	$1 < x < r$	$r < x < r$	$x > r$
$1-x+r-x+r-r$	$x-1+r-x+r-r$	$x-1+r-x+r-r$	$x-1+x-r+r-r$
$-r x + 1$	$-r x + r$	$r x - r$	$r x - 1$

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

$$y_{\min} = r$$

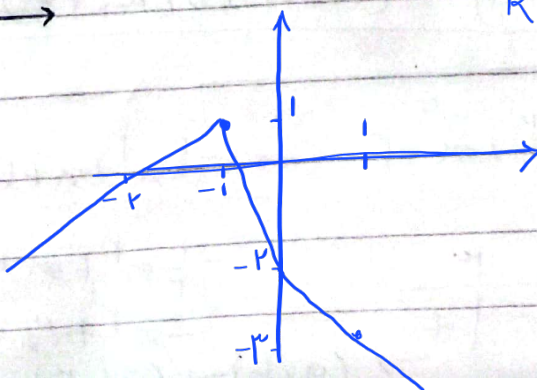
$$y = |x| - r|x+1|$$

(1)

$x < -1$	$-1 < x < 0$	$x > 0$
$-x+r(x+1)$	$-x-r(x+1)$	$x-r(x+1)$
$x+r$	$-r x - r$	$-x-r$

$$R_f = \mathbb{R}$$

$$R = (-\infty, 1]$$



$$y = \frac{x^2 + \Delta x + m}{x+1} \rightarrow xy + y = x^2 + \Delta x + m \quad (2) \quad (4)$$

$$x^2 + (\Delta - y)x + m - y = 0$$

$$\Delta < 0 \rightarrow (\Delta - y)^2 - 4(m - y) < 0$$

$$y^2 - 4y + \Delta^2 - 4m + 4y < 0$$

$$y^2 - 4(-4m + \Delta^2) < 0 \leftarrow \Delta < 0 \leftarrow y^2 - 4y + \Delta^2 - 4m < 0$$

$$16m - 4\Delta^2 < 0 \rightarrow m < \Delta^2 \rightarrow m = 1, 4, 9 \rightarrow \boxed{1, 4, 9}$$

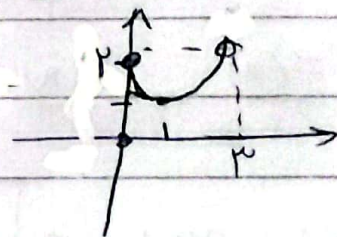
$$f(x) = \begin{cases} x+1 & x \geq 1 \\ x^2 - 4m + 1 & 1 < x < 1 \\ |x|+1 & x < 0 \end{cases} \rightarrow R_{f_1} = [\Delta, +\infty) \quad (5) \quad (V)$$

$$R_{f_2} = (1, \Delta)$$

$$R_{f_3} = (1, +\infty)$$

$$\begin{cases} x_S = \frac{-b}{2a} = 1 \\ y_S = 1 - 4 + 1 = 1 \end{cases}$$

$$\begin{cases} x=1 \rightarrow y=\Delta \\ x=0 \rightarrow y=1 \end{cases}$$



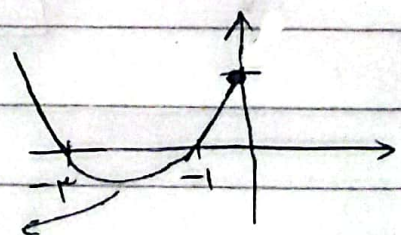
$$R_f = R_{f_1} \cup R_{f_2} \cup R_{f_3} = [1, +\infty)$$

$$f(x) = \begin{cases} x^2 + 4x + 1 & x \leq 0 \\ [4m] - 4x & x > 0 \end{cases} \quad (6) \quad (A)$$

$$R_{f_2} = (-1, 0)$$

$$x_S = -1$$

$$y_S = -1 \rightarrow R_{f_1} = [-1, +\infty)$$



$$R_f = R_{f_1} \cup R_{f_2} = (-1, 0) \cup [-1, +\infty) = [-1, +\infty)$$

$$y = a+1 - \sqrt{x+1}$$

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

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

$$x+1 \geq 0 \rightarrow x \geq -1 \rightarrow a \geq \frac{-1}{1} \rightarrow \boxed{b = \frac{-1}{1}}$$

$$x = \frac{-1}{1} \rightarrow y = a \rightarrow y = a+1 \rightarrow \boxed{a = 1}$$

$$ab = \left(\frac{-1}{1}\right)(1) = \boxed{-1}$$

$$D_f = D_g, f(x)g(x) = 3\sqrt{x+1} + 3\sqrt{1-x}, f(x) = \sqrt{x+1} + \sqrt{1-x} \quad (10)$$

$$y = \frac{f(x)}{3} - \frac{g(x)}{3} \rightarrow \frac{\sqrt{x+1} + \sqrt{1-x}}{3} - \frac{\sqrt{x+1} - \sqrt{1-x}}{3} =$$

$$f(x) + g(x) = 3\sqrt{\sqrt{x+1} + \sqrt{1-x}} = 3\sqrt{x+1} + 3\sqrt{1-x}$$

$$g(x) = 3\sqrt{x+1} + 3\sqrt{1-x} - (3\sqrt{x+1} + 3\sqrt{1-x}) = \sqrt{x+1} - \sqrt{1-x}$$

$$\frac{\sqrt{x+1} + 3\sqrt{1-x} - \sqrt{x+1} + \sqrt{1-x}}{3} = \sqrt{1-x}$$

$$y = \sqrt{1-x} \rightarrow \boxed{R_f = [0, +\infty)}$$

$$D = [-1, 1]$$

