Subject.
Date.

۱۹,۲۵

تکلیف ۵ - امیرپویا رزاق - یازدهم بیان B

۱,۷۵

(1) $f(x) = \sqrt{1-x^2} \Rightarrow 1-x^2 \geq 0 \Rightarrow -1 \leq x \leq 1 \Rightarrow x = -1, 0, 1$

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

$f(0) = 1 \quad f(1) = 0$

$\Rightarrow 2g - 3f \xrightarrow{x=-1} 2(1) - 3(0) = 2 \,,\, x = 0 \longrightarrow 2(4) - 3(1) = 5$

$\xrightarrow{x=1} 2(2) - 3(0) = 4 \Rightarrow \boxed{R = \{2, 4, 5\}}$ ✓

دقت!

مجموع → ۱۱

(2) $f(x) = 2x-1 \,,\, D_f = [3, +\infty) \,,\, g(x) = \frac{1}{2}x + 3 \,,\, D_g = (-\infty, 2]$

$f(3) = 5 \Rightarrow R_f = [5, +\infty) \Big\} \; g(2) = 4 \,,\, R_g = (-\infty, 4]$ ۲

کمترین مقدار دامنه

$\boxed{R_f \cup R_g = (-\infty, 4] \cup [5, +\infty)}$ ✓

(3) $y = \frac{-x^2}{2} + x + 3 \Rightarrow$ ۲

$\frac{-x^2}{2} + x + 3 > \frac{3}{2} \Rightarrow \frac{-x^2}{2} + x + \frac{3}{2} > 0 \Rightarrow x^2 - 2x - 3 < 0$

	-1		3	
+		−		+

$\Rightarrow -1 < x < 3 \Rightarrow x \in (-1, 3) \Rightarrow \begin{cases} b = 3 \\ a = -1 \end{cases} \Rightarrow \sqrt{b-a} = \sqrt{3-(-1)} = \sqrt{4} = 2$

$\Rightarrow \boxed{\sqrt{b-a}_{max} = 2}$ ✓

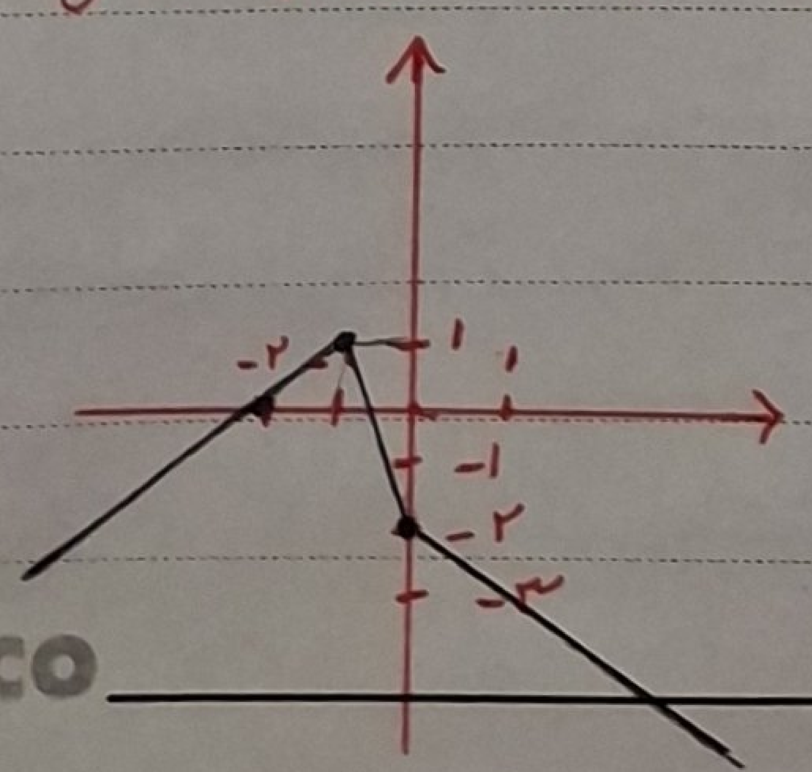
(4) $y = |x-1| + |x-3| + |2x-4| \Rightarrow y = |x-1| + |x-3| + 2|x-2|$ ۲

$x \geq 3 \rightarrow y = 4x - 8 \xrightarrow{x=3} y = 4 \,,\, 2 < x \leq 3 \rightarrow y = 2x - 2 \xrightarrow{x=2} y = 2$

$1 \leq x < 2 \rightarrow y = 6 - 2x \xrightarrow{x=1} y = 4 \,,\, x \leq 1 \rightarrow y = 8 - 4x \xrightarrow{x=1} y = 4$

$\Rightarrow \boxed{y_{min} = 2}$ ✓

(5) $y = |x| - 2|x+1| \Rightarrow y = \begin{cases} x - 2x - 2 & x > 0 \\ -x - 2x - 2 & -1 \leq x \leq 0 \\ -x + 2x + 2 & x < -1 \end{cases} \Rightarrow \begin{cases} -x - 2 & x \geq 0 \\ -3x - 2 & -1 \leq x \leq 0 \\ x + 2 & x \leq -1 \end{cases}$



$\boxed{R_f = (-\infty, 1]}$ ✓ ۲

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⑥ 1,5

$y = \dfrac{x^2+5x+m}{x+1} \quad (m \in \mathbb{N}) \Rightarrow xy + y = x^2+5x+m \Rightarrow x^2 + (5-y)x + (m-y) = 0$

$\Delta = (5-y)^2 - 4(m-y) \geq 0 \Rightarrow y^2 - 10y + 25 - 4m + 4y \geq 0$

$\Rightarrow y^2 - 6y + (25-4m) \geq 0 \Rightarrow \Delta_{min} = (3)^2 - 6(3) + (25-4m) \geq 0$

$\Rightarrow -9 + 25 - 4m \geq 0 \Rightarrow 16 - 4m \geq 0 \Rightarrow m \leq 4 \Rightarrow m = 1,2,3,4 \Rightarrow$

$\boxed{R = \mathbb{R}}$

اگه $m = 4$ باشه ۱۳ از برد حذف میشه و
دیگه $\mathbb{R}$ نیست پس $m = \{1,2,3\}$

⑦ 2

$f(x) = \begin{cases} x+2 \; ; \; x \geq 3 & \text{شرط ۱} \\ x^2-2x+2 \; ; \; 0 \leq x < 3 & \text{شرط ۲} \\ |x|+2 \; ; \; x < 0 & \text{شرط ۳} \end{cases}$

① $x \geq 3 \rightarrow x+2 \Rightarrow [5, +\infty)$, ② $x^2 - 2x + 2 = (x-1)^2 + 1 \Rightarrow [1, 5$

③ $x < 0 \rightarrow (2, +\infty) \Rightarrow R_f = ① \cup ② \cup ③ = [1, +\infty)$ ✓

⑧ 2

$f(x) = \begin{cases} x^2+4x+3 \; ; \; x \leq 0 \\ [2x] - 2x \; ; \; x \geq 0 \end{cases}$ $\quad x^2 + 4x + 3 \Rightarrow R = [y_{min}, +\infty) = [-1, +\infty)$

$[2x] - 2x \longrightarrow [t] - t \Rightarrow -1 < [t] - t \leq 0 \Rightarrow R_f = ① \cup ② =$

$\Rightarrow \boxed{R_f = [-1, +\infty)}$ ✓

⑨ $y = a + 1 - \sqrt{-1, +\infty}$ $\quad D_f = [b, +\infty) \quad R_f = (-\infty, 5]$ 2

$D_f = 2x + 3 \geq 0 \Rightarrow x \geq -\frac{3}{2} \Rightarrow b = -\frac{3}{2} \quad y = a + 1 - \sqrt{0} = a + 1$

$\Rightarrow a + 1 = 5 \Rightarrow a = 4$, $a = 4$ ✓, $b = -\frac{3}{2}$ ✓ $\Rightarrow ab = (4)(-\frac{3}{2}) = -6$

$\Rightarrow ab = -6$ ✓

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(10) $f(x) + g(x) = ۳\sqrt{۲ + ۲\sqrt{1-x^۲}} \Rightarrow ۳\sqrt{۲ + ۲\sqrt{1-x}\cdot\sqrt{x+1}} \Rightarrow ۳\sqrt{(\sqrt{x+1}) + \sqrt{1-x}}$

$f(x) + g(x) = ۳\sqrt{x+1} + ۳\sqrt{1-x}$; $f(x) = ۲\sqrt{x+1} + ۴\sqrt{1-x}$ ۲

$g(x) = (۳\sqrt{x+1} + ۳\sqrt{1-x}) - (۲\sqrt{x+1} + ۴\sqrt{1-x}) = \sqrt{x+1} - \sqrt{1-x}$

$y = \frac{f(x)}{۴} - \frac{g(x)}{۳} \Rightarrow \frac{۲\sqrt{x+1} + \overset{۲}{\cancel{۴}}\sqrt{1-x}}{\cancel{۴}\,۳} - \frac{\sqrt{x+1} - \sqrt{1-x}}{۳}$

$\Rightarrow y = \frac{\sqrt{x+1} + ۲\sqrt{1-x} - \sqrt{x+1} + \sqrt{1-x}}{۳} = \frac{۳\sqrt{1-x}}{۳} = \sqrt{1-x}$

$D_f = D_g = [1, 1]$, $R = [0, \sqrt{۲}]$

$\Rightarrow y = \sqrt{1-x}$, $D = [-1, 1]$, $R = [0, \sqrt{۲}]$ ✓

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