۲۰

«زهرا لارانی» «بنام خدا» «تکلیف ۴» «یازدهم ریاضی ۲»

.1 (۲)

الف) $y = x^3 - 3x^2 + 3x \rightarrow (x-1)^3 + 1 \rightarrow y - 1 = (x-1)^3 \rightarrow x = \sqrt[3]{y-1} + 1 \rightarrow R_f = \mathbb{R}$

ب) $y = \frac{1}{x^2 - 2x} \rightarrow yx^2 - 2xy - 1 = 0 \rightarrow \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 2\sqrt{y(y+1)}$, $y \neq 0$, $y = 0$, $y = -1$

$R_f = (-\infty, -1] \cup (0, +\infty)$

.2 (۲)

الف) $y = x^2 - 4x + 10 \rightarrow y = \frac{-\Delta}{4a} = \frac{-(16 - 4 \times 1 \times 10)}{4 \times 1} = 6 \rightarrow R = [6, +\infty)$

ب) $y = -x^2 + 6x + 3 \rightarrow y = \frac{-(36 - 4(-1)(3))}{-4} = 12 \rightarrow R = (-\infty, 12]$

ج) $y = \sqrt{x^2 - 4x - 3} \rightarrow y = \frac{-(16 - 4 \times 1 \times (-3))}{4} = -7 \rightarrow R = \sqrt{[-7, +\infty)} = [0, +\infty)$

د) $y = \sqrt{-x^2 + 6x} \rightarrow y = \frac{-(36 - 4 \times (-1) \times 0)}{-4} = 9 \rightarrow R = \sqrt{(-\infty, 9]} = [0, 3]$

.3 (۲)

الف) $y = x^3 - 5x^2 + 2x + 1 \rightarrow R = \mathbb{R}$

ب) $y = x^7 - 6x^4 + 3x + 2 \rightarrow R = \mathbb{R}$

ج) $y = \sqrt{x^7 - 6x^2 + 5x + 1} \rightarrow R = [0, +\infty)$

د) $y = (x^5 - 4x^2 + 3x + 1)^2 \rightarrow R = [0, +\infty)$

.4 (۲)

الف) $y = \frac{3x+1}{x-2} \rightarrow R = \mathbb{R} - \{3\}$

ب) $y = \frac{2x+1}{x+1} \rightarrow R = \mathbb{R} - \{2\}$

.5 (۲)

الف) $y = \sqrt{\frac{2x+4}{x+1}} \rightarrow R = \sqrt{\mathbb{R} - \{2\}} \rightarrow R = [0, +\infty) - \{\sqrt{2}\}$

ب) $y = \sqrt{\frac{3x+1}{2x}} \rightarrow y = \sqrt{\frac{3x+1}{-x+2}} \rightarrow R = \sqrt{\mathbb{R} - \{-3\}} \rightarrow R = [0, +\infty)$

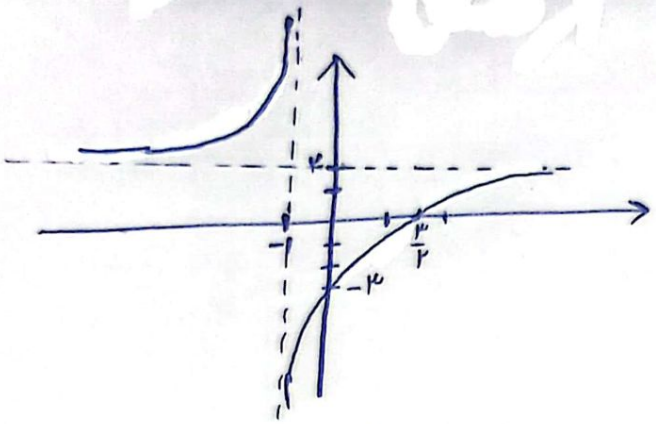
۶. ج

الف) $y = \frac{2x-3}{x+1}$

مجانب عمودی $\rightarrow -1$

مجانب افقی $\rightarrow 2$

$2-(-3)\cdot 5 > 0$ این

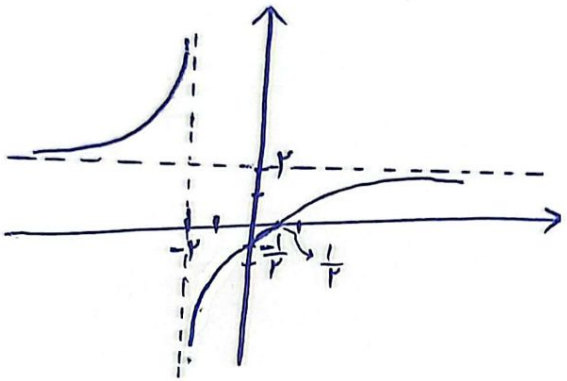


ب) $y = \frac{2x-1}{x+2}$

مجانب عمودی $\rightarrow -2$

مجانب افقی $\rightarrow 2$

$4-(-1)\cdot 5 > 0$ این



۷.

الف) $y = \sin x + \frac{1}{\sin x} \longrightarrow B = (-\infty, -2] \cup [2, +\infty)$

ب) $y = \frac{x^4+1}{x^2} = x^2 + \frac{1}{x^2} \longrightarrow B = (-\infty, -2] \cup [2, +\infty)$

ج) $y = \frac{\sqrt[3]{x^2}+1}{\sqrt[3]{x}} = \sqrt[3]{x} + \frac{1}{\sqrt[3]{x}} \longrightarrow B = (-\infty, -2] \cup [2, +\infty)$

د) $y = \sqrt{x} + \frac{1}{\sqrt{x}} \Longrightarrow B = [2, +\infty)$

۸.

الف) $y = x^2 + \frac{1}{x^2+2} \longrightarrow \left((x^2+2) + \frac{1}{x^2+2} \right) - 2 \longrightarrow R = [\frac{1}{2}, +\infty)$

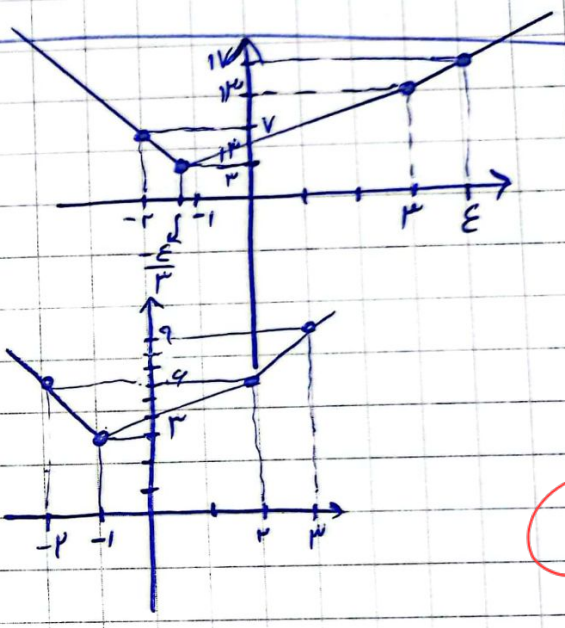
ب) $y = \frac{x^2+5}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \longrightarrow B = [\frac{5}{2}, +\infty)$

sometimes
never

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

$x = 3$, $x = -\frac{4}{3}$

$x < -\frac{4}{3}$	$-\frac{4}{3} \le x < 3$	$x \ge 3$
$3 - x - 3x - 4$	$3 - x + 3x + 4$	$x - 3 + 3x + 4$
$-4x - 1$	$2x + 7$	$4x + 1$
$\frac{13}{3}$	13	



ii) $y = |x-2| + |2x+2|$

$x = 2$, $x = -1$

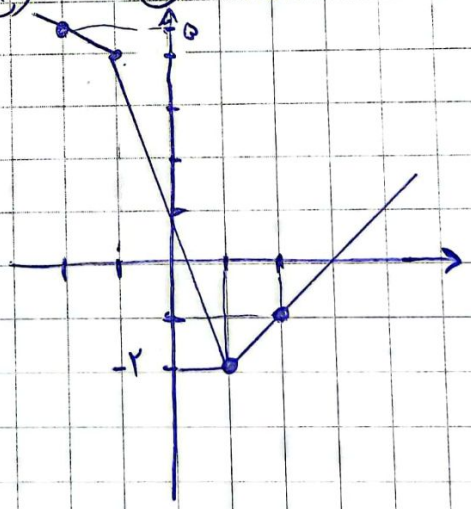
$x < -1$	$-1 \le x < 2$	$x \ge 2$
$2 - x - 2x - 2$	$2 - x + 2x + 2$	$x - 2 + 2x + 2$
$-3x$	$x + 4$	$3x$
3	6	

$R = [3, +\infty)$

c) $|2x-2| - |x+1|$

$x = 1$, $x = -1$

$x < -1$	$-1 \le x < 1$	$x \ge 1$
$2 - 2x + x + 1$	$2 - 2x - x - 1$	$2x - 2 - x - 1$
$-x + 3$	$-3x + 1$	$x - 3$
4	-2	



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

Teka