Subject : خلاصه مختاری - پایه دهم | بنام خدا | (۲۰) | Date: تکلیف ۶

۱) (۲)

الف) $y = x^3 - 3x^2 + 3x - 1 + 1$

$y - 1 = (x-1)^3 \xrightarrow{\sqrt[3]{\ }} \sqrt[3]{y-1} = x - 1$

$\hookrightarrow x = \sqrt[3]{y-1} + 1$ $\quad R_f = \mathbb{R}$

ب) $y = \frac{1}{x^2 - 2x}$ $\quad yx^2 - 2xy = 1 \rightarrow yx^2 - 2yx - 1 = 0$

$y(x^2 - 2x) = 1 \quad x^2 - 2x = \frac{1}{y}$

$\hookrightarrow x^2 - 2x + 1 = \frac{1}{y} + 1$

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

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

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

۲) (۲)

الف) $x^2 - 4x + 10 = y \quad 4 - 8 + 10 = 6$

$\frac{-b}{2a} \rightarrow \frac{+4}{2} = 2$

$-\frac{\Delta}{4a} \rightarrow 6$ $\quad a > 0 \rightarrow$ تابع Min دار

$R_f = [6, +\infty)$

ب) $y = -x^2 + 4x + 3$

$-\frac{b}{2a} \quad \frac{-4}{-2} = +2$

$-\frac{\Delta}{4a} \quad -4 + 8 + 3 = 12$ $\quad a < 0 \rightarrow$ تابع Max دار

$R_f = (-\infty, 12]$

ج) $y = \sqrt{x^2 - 4x - 5}$ $\quad \rightarrow x^2 - 4x - 5$

$\frac{-b}{2a} \quad \frac{+4}{2} = 2$

$-\frac{\Delta}{4a} \quad 4 - 8 - 5 = -9$ $\quad a > 0$

$\sqrt{\ } \rightarrow [-9, +\infty]$

تابع Min دار

$R_f = [0, +\infty]$

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ج) $y = \sqrt{9x - x^2} \rightarrow -x^2 + 9x$

$\frac{-b}{2a} \Rightarrow \frac{-9}{-2} = 4.5$ $\quad \sqrt{(-\infty, 9]} \rightarrow R_f = [0, 3]$

$-\frac{\Delta}{4a}$ $\quad -9 + 18 \Rightarrow (9)$ $\quad a < 0 \rightarrow$ تابع Max دار

الف) $x^3 - 5x^2 + 2x + 1 = y$ $\quad R_f = \mathbb{R}$ (۲) (۴)

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

ج) $\sqrt{x^2 - 4x^2 + 5x + 1} \Rightarrow \sqrt{\mathbb{R}} \Rightarrow [0, +\infty) = R_f$

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

$\downarrow$ $(\mathbb{R})^2$ $\quad$ ↺ $[0, +\infty)$

الف) $\frac{3x+1}{x-2}$ $\quad \frac{a}{c} = 3$ (۳) (۴)

$R_f = \mathbb{R} - \{3\}$

ب) $\frac{2x+1}{x+1}$ $\quad \frac{a}{c} = \frac{2}{1} = 2$

$R_f = \mathbb{R} - \{2\}$

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(الف)

$y = \sqrt{\frac{2x+4}{x+1}} \rightarrow \sqrt{\mathbb{R} - \{1\}} \rightarrow [0, +\infty) - \{\sqrt{2}\} = R_f$ ⑤

(ب)

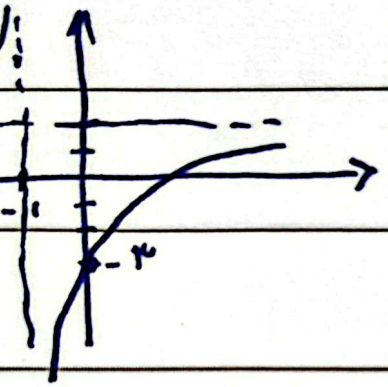
$y = \sqrt{\frac{3x+1}{-x+2}} \rightarrow \sqrt{R - \{2\}} \rightarrow [0, +\infty) = R_f$

الف) $\frac{2x-3}{x+1} \rightarrow \frac{ax+b}{cx+d}$

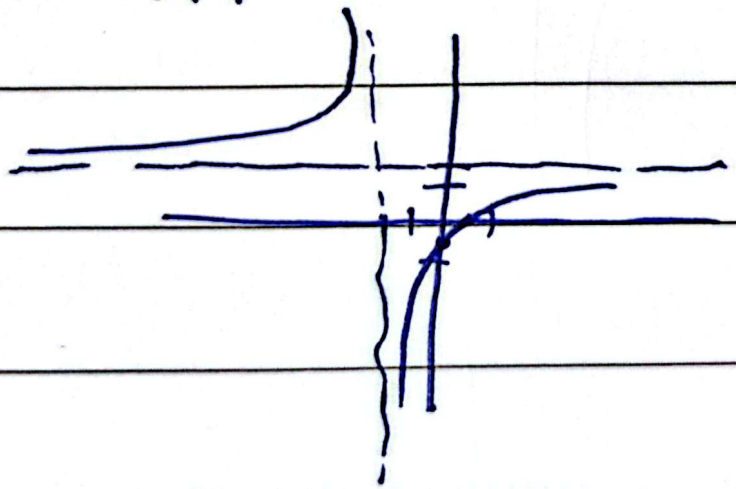
$x+1=0 \rightarrow x=-1$

$\frac{a}{c} \Rightarrow \frac{2}{1}=2$

$x=0 \rightarrow y=-3$



ب) $y=\frac{2x-1}{x+2} \rightarrow x+2=0 \rightarrow x=-2 \quad \frac{a}{c}=2$



if $x \rightarrow \frac{1}{2} \rightarrow 0=y$

if $x \rightarrow 0 \rightarrow -\frac{1}{2}=y$

الف) $y = \sin x + \frac{1}{\sin x} \rightarrow \sin x = a$

$\hookrightarrow a + \frac{1}{a} \rightarrow \boxed{R_y = (-\infty, -2] \cup [2, +\infty)}$

ب) $\frac{x^4 + 1}{x^2} \Rightarrow \frac{x^4}{x^2} + \frac{1}{x^2} \rightarrow x^2 + \frac{1}{x^2} \rightarrow x^2 = a'$

$\hookrightarrow a' + \frac{1}{a'} \rightarrow \boxed{R_y = (-\infty, -2] \cup [2, +\infty)}$

ج) $\frac{\sqrt[3]{x^2} + 1}{\sqrt[3]{x}} \Rightarrow \sqrt[3]{x} + \frac{1}{\sqrt[3]{x}} \Rightarrow \sqrt[3]{x} = a''$

$\} \; a'' + \frac{1}{a''} \; \boxed{R_y = (-\infty, -2] \cup [2, +\infty)}$

ا) $\sqrt{x} + \frac{1}{\sqrt{x}} : y \rightarrow$ $\boxed{R_y = [2, +\infty)}$

ب) $y = x^2 + \frac{1}{x^2+1} \xrightarrow{+3-3} \left(x^2+3+\frac{1}{x^2+3}\right) - 3$ (۵) (۸)

$x=0 \rightarrow 3 + \frac{1}{3} - 3 \rightarrow \left(\frac{1}{3}\right)$ $\underline{R_f = \left[\frac{1}{3}, +\infty\right)}$

ج) $y = \frac{x^2+5}{\sqrt{x^2+4}} \rightarrow \frac{x^2+4}{\sqrt{x^2+4}} + \frac{1}{\sqrt{x^2+4}}$

$\sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}}$

if $x=0$ $\rightarrow$ $2 + \frac{1}{2} \rightarrow \frac{5}{2}$

$\underline{R_f = \left[\frac{5}{2}, +\infty\right)}$

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

$x=3$ $-\frac{2}{3}$

$-\frac{2}{3}$ 3

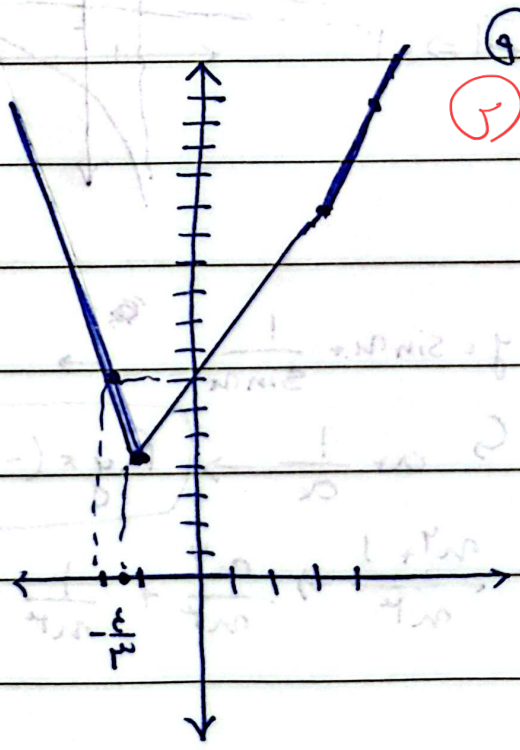
$-x+3-2x-2$ | $-x+2+2x+2$ | $x-3+2x+2$

$-3x-1$ $\left(\frac{11}{3}\right)$ $2x+5$ (13) $3x+1$

$-2, 5$ $2 \rightarrow 11$

$-3 \rightarrow 11$ $0 \rightarrow 1$

(۹) (۵)



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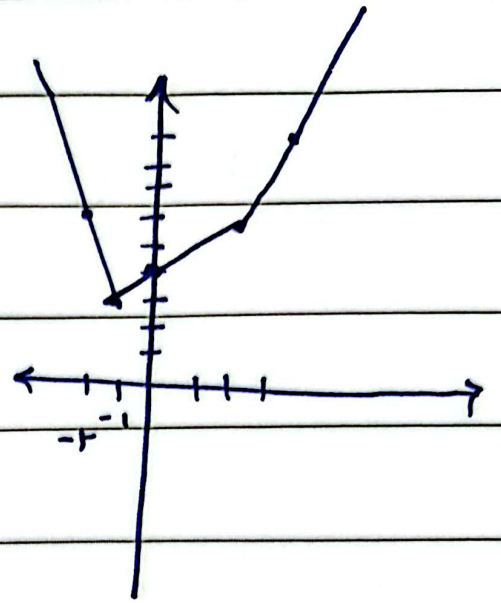
$y = |2x-2| + |2x+2|$

$R_y = [2, +\infty)$

-1	2
$-2x+2-2x-2$	$-2x+2+2x+2$	$2x-2+2x+2$
$-4x$	(2) 4	(4) $4x$

-2	2	-1	0	3
6	4	2	2	4



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

$x=1$ $x=-1$

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

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

-1	1	0	2	3
4	-2	1	-1	0