باران داوجی / تکلیف شماره ۱۹ / [illegible] ۱۸٫۵

۱)

الف) $y = x^2 - 5$ $\quad x^2 = y + 5$

$y + 5 \geq 0 \quad y \geq -5 \Rightarrow$

$R_f = [-5, +\infty)$

ب) $y = x^3 + 1 \quad x^3 = y - 1$

$x = \sqrt[3]{y-1}$

$R_f = \mathbb{R}$

۲)

الف) $y = x^2 - 4x + 6 \Rightarrow y = (x-2)^2 + 2$

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

$x = \sqrt{y+2} + 2 \Rightarrow \quad y + 2 \geq 0$

$y \geq -2 \quad R_f \ [-2, +\infty)$

ب) $y = x^2 - 5x + 1 \Rightarrow y = (x^2 - \frac{5}{2})^2 - \frac{21}{4}$

$(x^2 - \frac{5}{2})^2 = y + \frac{21}{4} \Rightarrow y + \frac{21}{4} \geq 0$

$y \geq -\frac{21}{4} \quad R_f = [-\frac{21}{4}, +\infty)$

۳)

الف) $y = \frac{x^2 + 3}{x^2 - 2} \Rightarrow yx^2 - 2y = x^2 + 3$

$yx^2 - x^2 = 3 + 2y \Rightarrow x^2(y-1) = \frac{3+2y}{1}$

$x^2 = \frac{3+2y}{y-1} \Rightarrow \frac{3+2y}{y-1} \geq 0$

$-\frac{3}{2} \quad 1$

$+ \mid - \mid + \quad R_f = (-\infty, -\frac{3}{2}] \cup [1, +\infty)$

ب) $y = \frac{2|x|+1}{|x|-4} \Rightarrow y|x| - 4y = 2|x| + 1$

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

$|x| = \frac{1+4y}{y-2} \Rightarrow \frac{1+4y}{y-2} \geq 0 \Rightarrow$

$-\frac{1}{4} \quad 2$

$+ \mid - \mid + \quad R_f = (-\infty, -\frac{1}{4}] \cup [2, +\infty)$

۴)

الف) $y = \frac{1}{x^2 - 4x} \Rightarrow y = \frac{1}{(x-2)^2 - 4} \Rightarrow (x-2)^2 y - 4y = 1 \Rightarrow$

$y((x-2)^2 - 4) = 1 \Rightarrow (x-2)^2 - 4 = \frac{1}{y} \Rightarrow (x-2)^2 = \frac{1+4y}{y} \Rightarrow$

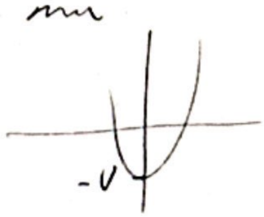
$\frac{1+4y}{y} \geq 0 \quad -\frac{1}{4} \quad 0$

$+ \mid - \mid + \quad (-\infty, -\frac{1}{4}] \cup [0, +\infty) = R_f$

۵)

الف) $y = x^2 - 6x + 2 \Rightarrow \left| \begin{array}{l} -\frac{b}{2a} = \frac{6}{2} = 3 \\ -7 \end{array} \right.$

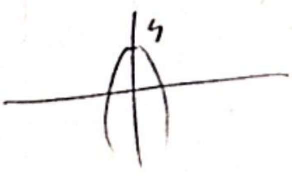
min



$R_f = [-7, +\infty)$

ب) $y = -x^2 + 4x + 2 \quad \left| \begin{array}{l} -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ 6 \end{array} \right.$

max



$(-\infty, 6]$

۶) الف)

$y=\sqrt{\underbrace{x^2-4x+2}_{\min}}$ | $-\frac{b}{2a}=\frac{4}{2}=2$, -7

$R_f=\sqrt{[-7,+\infty)} \Rightarrow [0,+\infty)=R_f$

۳

ب)

$y=\sqrt{\underbrace{-x^2+4x+10}_{\max}} \Rightarrow$ | $-\frac{b}{2a}=\frac{-4}{-2}=2$, 14

$R_f=\sqrt{(-\infty,+14]} \Rightarrow [0,\sqrt{14}]=R_f$

۷) الف)

$y=x^7+3x^4+2x+1$

بزرگترین توان = ۷

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$R_f=\mathbb{R}$

ب)

$y=\sqrt{x^4+4x^2+6x+1} \Rightarrow$

$R_f=\sqrt{(-\infty,+\infty)} \Rightarrow [0,+\infty)$

۸) الف)

$y=\frac{3x+1}{x-2} \Rightarrow \frac{3}{1}=3$

۳

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

ب)

$y=\sqrt{\frac{4x+1}{x+2}} \Rightarrow \frac{4}{1}=4$

$R_f=\sqrt{\mathbb{R}-\{4\}} \Rightarrow [0,+\infty)-\{2\}$

۹) الف)

$y=\frac{3x+1}{x-2} \Rightarrow$

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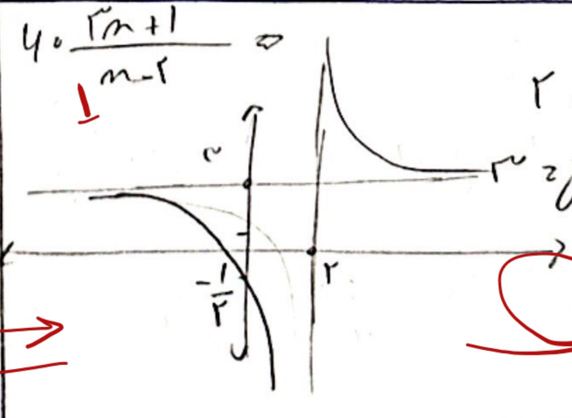
مجانب قائم، ۲

مجانب افقی = ۳



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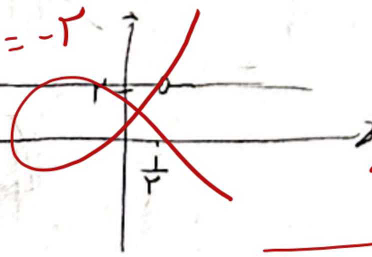
ب)

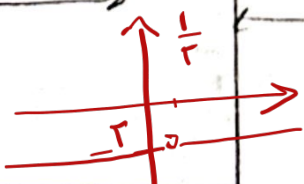
$y=\frac{4x-2}{1-2x} \Rightarrow y=-2$ مقطع

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

$1-2x\neq 0$

$x\neq\frac{1}{2}$





۱۰) الف)

$y=\cos^2x+\frac{1}{\cos^2x} \Rightarrow \cos^2x=a$

$a+\frac{1}{a} \Rightarrow (a>0) \Rightarrow R_f=[2,+\infty)$

۱

۱٫۲۵

ب)

$\sqrt[3]{\frac{x^2+1}{x}} \Rightarrow \frac{x^2}{x}+\frac{1}{x} \Rightarrow x+\frac{1}{x} \Rightarrow$

بدون تساوی

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

$x>0 \to [\sqrt[3]{2},+\infty)$

$x<0 \to (-\infty,\sqrt[3]{-2}]$