«به نام خداوند»

نام و نام خانوادگی: مجتبی معصومیان   کلاس: دهم   پایه: B   تکلیف شماره: شماره ۹

1

الف) $y = x^2 - 5$ $-x^2 = -y - 5 \Rightarrow x^2 = y + 5$ $x = \pm\sqrt{y+5} \Rightarrow y + 5 \geq 0$ $y \geq -5$

$\Rightarrow \boxed{R_f = [-5, +\infty)}$

ب) $y = x^3 + 1$ $-x^3 = -y + 1$ $x^3 = y - 1 \Rightarrow$ $x = \sqrt[3]{y-1} \Rightarrow \boxed{R_f = \mathbb{R}}$

2

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

$(x-2)^2 = y - 2$ $x - 2 = \pm\sqrt{y-2}$ $x = 2 \pm \sqrt{y-2}$ $y - 2 \geq 0$ $y \geq 2$ $\boxed{R_f = [2, +\infty)}$

ب) $y = x^2 - 5x + 1$ $y = x^2 - 5x + 1 + \frac{21}{4} - \frac{21}{4}$ $\Rightarrow y = (x - 2.5)^2 - \frac{21}{4}$ $-(x - 2.5)^2 = -y - \frac{21}{4}$

$(x - 2.5)^2 = y + \frac{21}{4}$ $x - 2.5 = \pm\sqrt{y + \frac{21}{4}}$ $x = 2.5 \pm \sqrt{y + \frac{21}{4}}$ $y + \frac{21}{4} \geq 0$ $y \geq -\frac{21}{4}$ $\boxed{R_f = [-\frac{21}{4}, +\infty)}$

$\boxed{[5.25, +\infty)}$

3

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

$x^2 = \frac{-3-2y}{1-y} \Rightarrow x = \sqrt{\frac{3+2y}{y-1}}$ $\frac{3+2y}{y-1} \geq 0$ (−1.5, 1: + 0 − ∄ +) $\boxed{R_f = (-\infty, -1.5] \cup (1, +\infty)}$

ب) $y = \frac{2|x|+1}{|x|-4} \Rightarrow |x|y - 4y = 2|x| + 1$ $|x|(y-2) = 4y + 1$ $\boxed{\Rightarrow R_f = (-\infty, -\frac{1}{4}] \cup (2, +\infty)}$

$|x|y - 2|x| = 4y + 1$ $|x| = \frac{4y+1}{y-2}$ $\frac{4y+1}{y-2} \geq 0$ ($-\frac{1}{4}$, 2: + 0 − ∄ +)

4

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

$y = \frac{1}{(x-2)^2 - 4} \Rightarrow$ $y(x-2)^2 - 4y = 1$ $y(x-2)^2 - 4y - 1 = 0$ $\frac{4y+1}{y} = (x-2)^2$

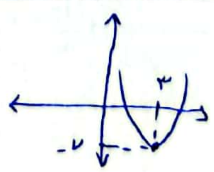
$\frac{4y+1}{y} \geq 0$ $-4y - 1 = -y(x-2)^2$ $\pm\sqrt{\frac{4y+1}{y}} = x - 2$

$4y + 1 = y(x-2)^2$

($-\frac{1}{4}$, 0: + 0 − ∄ +) $\Rightarrow \boxed{R_f = (0, +\infty) \cup (-\infty, -\frac{1}{4}]}$ $2 \pm \sqrt{\frac{4y+1}{y}} = x$

5

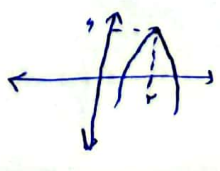
الف) $y = x^2 - 6x + 2$ ext, $a > 0 \Rightarrow \min$ | $-\frac{b}{2a} = \frac{6}{2} = 3$; $9 - 18 + 2 = -7$



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

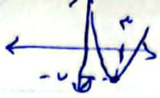
ب) $y = -x^2 + 4x + 2$ ext | $-\frac{b}{2a} = \frac{-4}{-2} = 2$; $-4 + 8 + 2 = 6$

$-1 < 0 \Rightarrow \max$



$\Rightarrow \boxed{R_f = (-\infty, 6]}$

الف) $\sqrt{x^2-6x+2}$ ext $\frac{-b}{2a}=\frac{6}{2}=3$ ، $9-18+2=-7$ ، $1>0 \Rightarrow min$



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

$\Rightarrow R_f=[0,+\infty)$ ۶

ب) $y=\sqrt{-x^2+4x+10}$ ext $\frac{-b}{2a}=\frac{-4}{-2}=2$ ، $-4+8+10=14$ ، $-1<0 \Rightarrow max$

$\Rightarrow (-\infty,14]$

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

الف) $y=x^7+3x^5+2x+1$ $\boxed{R_f=R}$

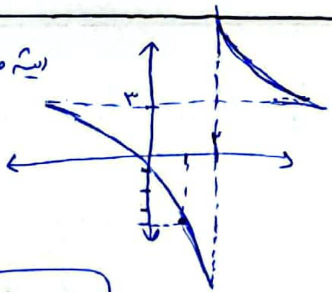
ب) $\sqrt{x^5+4x^3+6x+1} \Rightarrow R_f=\sqrt{R} \Rightarrow \boxed{R_f=[0,+\infty)}$ ۷

الف) $y=\frac{2x+1}{x-2} \Rightarrow \boxed{R_f=R-\{2\}} \Rightarrow R-\{\frac{a}{c}\}$

ب) $y=\sqrt{\frac{4x+1}{x+2}} \Rightarrow R_f=\sqrt{R-\{4\}} \Rightarrow \boxed{[0,+\infty)-\{2\}=R_f}$ ۸

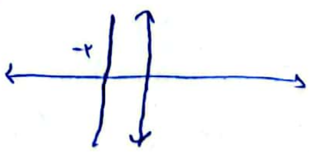
الف) $\frac{3x+1}{x-2}$ ریشه مخرج ← ۲ = مجانب قائم

مجانب افقی = ۳



if $x=1 \Rightarrow \frac{4}{-1}=-4$

ب) $y=\frac{4x-2}{1-2x} \Rightarrow \frac{2(\cancel{2x-1})}{-(\cancel{2x-1})}=-2 \Rightarrow \boxed{y=-2}$ ۹



الف) $\cos^2 x+\frac{1}{\cos^2 x} \Rightarrow a+\frac{1}{a}\geq 2$ if $a>0$ $\Rightarrow \boxed{R_f=[2,+\infty)}$

ب) $y=\sqrt[3]{\frac{x^2+1}{x}} \Rightarrow \sqrt[3]{x+\frac{1}{x}} \to y^3=x+\frac{1}{x}$ $y^3\geq 2$ $y^3\leq -2$ $y\geq\sqrt[3]{2}$ ۱۰

$y\leq\sqrt[3]{-2}$

$\boxed{\Rightarrow R_f=[\sqrt[3]{2},+\infty)\cup(-\infty,\sqrt[3]{-2}]}$