نام و نام خانوادگی: فاطمه زهرا جلال زاده   شماره تکلیف: ۹   کلاس: دهم دختر A

Subject:

۱) الف) $y = x^2 - 5 \rightsquigarrow \sqrt{x^2} = \sqrt{y+5}$

$x = \pm\sqrt{y+5} \rightsquigarrow y+5 \geq 0$

$y \geq -5$

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

ب) $y = x^3 + 1$ $\boxed{R_f = \mathbb{R}}$

۲) الف) $y = x^2 - 4x + 6 \rightsquigarrow y = x^2 - 4x + 4 + 2$

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

$\sqrt{y-2} = \sqrt{(x-2)^2} \rightsquigarrow x - 2 = \pm\sqrt{y-2}$

$x = 2 \pm \sqrt{y-2}$

$y - 2 \geq 0$

$y \geq 2 \Rightarrow \boxed{R_f = [2, +\infty)}$

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

$y = x^2 - 5x + \frac{25}{4} - \frac{21}{4} \rightsquigarrow y = (x - \frac{5}{2})^2 - \frac{21}{4}$

$\boxed{R_f = [\frac{-21}{4}, +\infty)}$

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

$x = \frac{5}{2} \pm \sqrt{y + \frac{21}{4}} \rightsquigarrow y + \frac{21}{4} \geq 0$

$\Rightarrow y \geq \frac{-21}{4}$

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

$yx^2 - x^2 = 2y + 3$

$x^2(y-1) = 2y + 3$

$\sqrt{x^2} = \sqrt{\frac{2y+3}{y-1}} \rightsquigarrow x = \pm\sqrt{\frac{2y+3}{y-1}}$

$\frac{2y+3}{y-1} \geq 0$

$2y + 3 \geq 0 \rightsquigarrow \boxed{y \geq \frac{-3}{2}}$

$y - 1 > 0 \rightsquigarrow \boxed{y > 1}$

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

$+ \quad 0 \quad - \quad ∄ \quad +$

$\Rightarrow \boxed{R_f = (-\infty, -1.5] \cup (1, +\infty)}$

Hashtag
HASHTAG

Scanned with CamScanner

Subject: Date: / /

ب) $y = \dfrac{2|x|+1}{|x|-4} \rightsquigarrow y|x| - 4y = 2|x| + 1$

$y|x| - 2|x| = 4y + 1$

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

$|x| = \dfrac{4y+1}{y-2} \rightsquigarrow \dfrac{4y+1}{y-2} \geq 0$ چون قدرمطلق همیشه + است

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

$y-2 > 0 \rightarrow \boxed{y > 2}$

$-\frac{1}{4}$, 2: $+ \quad - \quad +$

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

---

۴) $y = \dfrac{1}{x^2 - 4x} \rightsquigarrow yx^2 - 4xy = 1$

$yx^2 - 4xy - 1 = 0 \rightsquigarrow \Delta = b^2 - 4ac$

$\Delta = 16y^2 + 4y$

$x = \dfrac{-b \pm \sqrt{\Delta}}{2a} \rightsquigarrow x = \dfrac{4y \pm \sqrt{16y^2 + 4y}}{2y}$

$16y^2 + 4y \geq 0 \rightsquigarrow 4y(4y+1) \geq 0 \rightsquigarrow 4y \geq 0$, $\boxed{y \geq 0}$; $4y + 1 \geq 0 \rightsquigarrow 4y \geq -1 \rightsquigarrow \boxed{y \geq \frac{-1}{4}}$

$2y > 0 \rightsquigarrow \boxed{y > 0}$

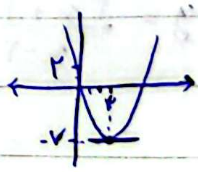
$-\frac{1}{4}$, 0: $+ \quad - \quad +$

$\boxed{(-\infty, -\frac{1}{4}] \cup (0, +\infty)}$

---

۵) الف) $x^2 - 6x + 2 \rightsquigarrow \text{Min} \;\Big|\; \dfrac{-b}{2a} = \dfrac{6}{2} = 3$

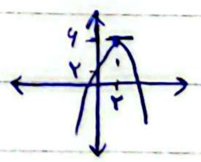
$9 - 18 + 2 = -7$



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

ب) $-x^2 + 4x + 2$ $\quad \text{Max} \;\Big|\; \dfrac{-b}{2a} = \dfrac{-4}{-2} = 2$

$-4 + 8 + 2 = 6$



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

Subject: Date: / /

۶)

الف) $y=\sqrt{x^2-6x+2}$ Min $\left|\begin{array}{l} \frac{-b}{2a}=\frac{6}{2}=3 \\ 9-18+2=-7 \end{array}\right.$

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

ب) $y=\sqrt{-x^2+4x+10}$ Max $\left|\begin{array}{l} \frac{-b}{2a}=\frac{-4}{-2}=2 \\ -4+8+10=14 \end{array}\right.$

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

---

۷) بزرگترین توان فرد ⇐ $\boxed{R_f=\mathbb{R}}$

الف) $y=x^7+3x^4+2x+1$

ب) $y=\sqrt{x^5+4x^2+6x+1}$

بزرگترین توان فرد است پس برد همان $\mathbb{R}$ است ولی چون زیر رادیکال است اعداد منفی را نمی‌توان درنظر گرفت ⇐ $\boxed{R_f=[0,+\infty)}$

---

۸)

الف) $y=\frac{3x+1}{x-2}$ $c\neq 0$ $bc\neq ad$ ⇒ $\boxed{R_f=\mathbb{R}-\{3\}}$

ب) $y=\sqrt{\frac{4x+1}{x+2}}$ ⇒ $\frac{a}{c}=\frac{4}{1}=4$ ⇝ $R_f=\sqrt{\mathbb{R}-\{4\}}$

$R_f=[0,+\infty)-\{2\}=\boxed{[0,2)\cup(2,+\infty)}$

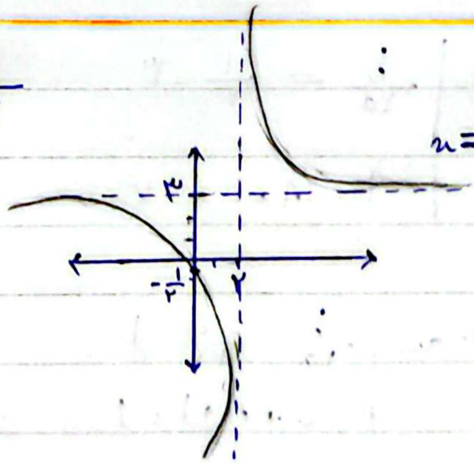
---

۹)

الف) $y=\frac{3x+1}{x-2}$

مجانب افقی ← $\frac{a}{c}=3$

مجانب عمودی ← ریشه مخرج: $x=2$



Hashtag.
HASHTAG

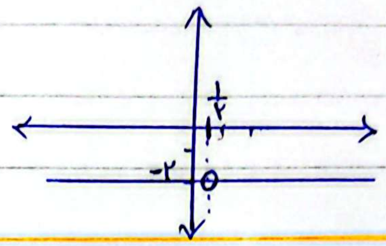
Subject: Date: / /

شرط $ad \neq bc$ برقرار نیست

ب) $\frac{4x-2}{1-2x}$ $\quad 1-2x \neq 0$

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

$y = \frac{4}{-2} = -2$



۱۰) الف) $y = \cos^2 x + \frac{1}{\cos^2 x} \rightsquigarrow a + \frac{1}{a} \xrightarrow{if} a > 0 \to [2, +\infty)$

$\cos^2 x > 0 \Rightarrow R_f = [2, +\infty)$

ب) $y = \sqrt[3]{\frac{x^2+1}{x}} \Rightarrow y = \sqrt[3]{x + \frac{1}{x}} \Rightarrow x + \frac{1}{x} \to (-\infty, -2] \cup [2, +\infty)$

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

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

Hashtag
HASHTAG

Scanned with CamScanner