

نام و نام خانوادگی: ... پاسخنامه تشریحی تکلیف شماره ... کلاس ...

$$\begin{aligned} x \cdot f(-x) - x f(x) &= 2|x| + 1 \\ -x \cdot f(x) - x f(-x) &= 2|x| + 1 \end{aligned} \quad \left. \begin{array}{l} \text{معادله بالا را با } x \text{ ضرب} \\ \text{دو معادله با هم جمع کنیم} \end{array} \right\} \rightarrow x f(-x) - x f(x) = x(2x+1)$$

$$\xrightarrow[\text{در معادله}]{\text{تفاضل}} (x^2+1) f(x) = (1-x)(2|x|+1) \Rightarrow f(x) = \frac{(1-x)(2|x|+1)}{x^2+1}$$

جواب

$$x=0 \rightarrow 2f(0) = 4 \rightarrow f(0) = 2 \rightarrow f(x) + 3 = x^2 - 2x + 4$$

$$\rightarrow f(x) = x^2 - 2x + 1$$

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

جواب

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

$$x = \frac{-(y-1) \pm \sqrt{(y-1)^2 - 4(2+y)}}{2} \rightarrow \begin{aligned} &y^2 - 4y - 7 \geq 0 \\ &(y-7)(y+1) \geq 0 \end{aligned}$$

$$R_f = (-\infty, -1] \cup [7, +\infty)$$

جواب

$$y = \log(x^2 - 4x^2 + 7x + 8)$$

چون چند جمله‌ای درجه فرد است و همچنین تابعی نبوده است و هر مقدار حقیقی را دارد پس:

$$R_f = \mathbb{R}$$

جواب

$$y = \sqrt{x^2 - 4x^2 + 8x + 1}$$

$$R_f = \mathbb{R}$$

$$R_y = [0, +\infty)$$

جواب

$$y = \sqrt{-x^2 + 4x - 5}$$

$$x_5 = \frac{-4}{-2} = 2$$

$$y_5 = -4 + 16 - 5 = 7$$

$$R_f = [0, 7]$$

جواب

$$y = 2x^2 - 8x + 1$$

$$x_5 = \frac{8}{4} = 2$$

$$y_5 = -16 + 16 + 1 = 1$$

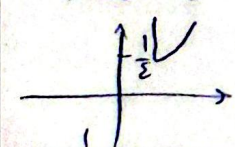
$$R_f = [-1, +\infty)$$

جواب

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

$$x^2 + 2 + \frac{1}{x^2+2} - 2$$

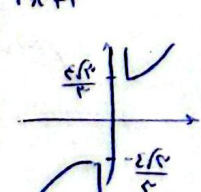
$$\min(x^2+2) = 2$$



$$R_f = [2, +\infty)$$

جواب

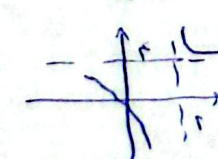
$$\frac{x^2+2}{x^2+2} = \sqrt{x^2+2} + \frac{1}{\sqrt{x^2+2}}$$



$$R_f = [2, +\infty)$$

جواب

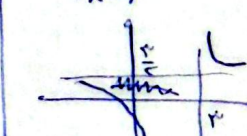
$$y = \sqrt{\frac{x^2+1}{x-2}}$$



$$R_y = [0, +\infty) - \{2\}$$

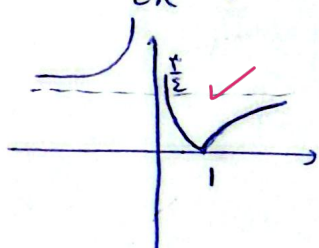
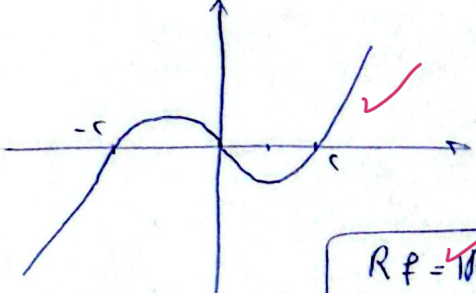
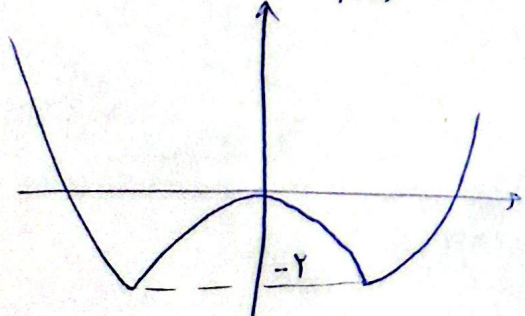
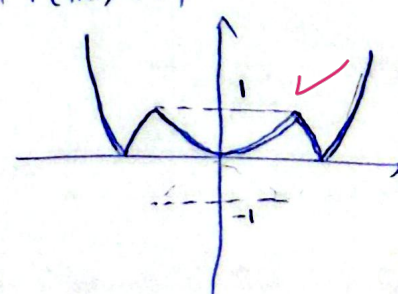
جواب

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



$$R_f = \mathbb{R} - \{1/4, 1/2\}$$

جواب

$y = \frac{r^2 x^r + \varepsilon}{x^r - 1} \rightarrow y x^r - y = r x^r + \varepsilon \rightarrow (r - y) x^r + y + \varepsilon = 0$ $\Delta \text{ روشی} \rightarrow \frac{\pm \sqrt{r(y + \varepsilon)(y - r)}}{y - ry} \rightarrow (y + \varepsilon)(y - r) \geq 0 \quad \frac{-\varepsilon}{r - 1} +$ $y \neq r$	روشی اصلی (۲) $R_f = (-\infty, -\varepsilon] \cup (r, +\infty)$ جواب ۶
$y = \frac{r^2 x^r + \varepsilon}{x^r - 1}$ $\begin{matrix} \min x^r \\ 0 \end{matrix} \rightarrow -\varepsilon$ $\begin{matrix} \max x^r \\ +\infty \end{matrix} \rightarrow r$ $R_f = (-\infty, -\varepsilon] \cup (r, +\infty)$	روشی تذکر (۲) استخراج می شود ۷
$y = \frac{r \sin x + \varepsilon}{\sin x - r}$ $\begin{matrix} \max \sin x \\ 1 \end{matrix} \rightarrow \frac{r + \varepsilon}{1 - r} = \frac{r}{-r} = -1$ $\begin{matrix} \min \sin x \\ -1 \end{matrix} \rightarrow \frac{-r + \varepsilon}{-1 - r} = \frac{r}{-\varepsilon} = -\frac{1}{r}$ $R_f = [-1, -\frac{1}{r}]$	استخراج می شود (۲) ۷
$y = \sqrt{\frac{9x - 11}{5x - 11}} = \sqrt{\frac{9(x - c)}{5(x - c)}}$ $R_f = \left\{ \frac{r}{r} \right\}$	(ب) $y = \left \frac{r^2 x - 1}{\varepsilon x} \right $  $R_f = [r, +\infty)$ ۸
$y = x x - rx$ $x \geq 0 \rightarrow x^2 - rx = x(x - r)$ $x < 0 \rightarrow -x^2 - rx = -x(x + r)$	 $R_f = \mathbb{R}$ ۹
$f(x)$ 	$ f(x) + 1 $  ۱۰