

19, 25

دارم دفتر A

کتابت شماره 4

نام و نام خانوادگی: ...

1 
$$\begin{cases} f(x) - x f(-x) \leq 2|x| + 1 \\ f(x) + x f(-x) \leq 2|x| + 1 \end{cases} \xrightarrow{x-x} \begin{cases} -x f(-x) + x^2 f(x) \leq 2|x|x - x \\ f(x) + x f(-x) \leq 2|x| + 1 \end{cases} \Rightarrow f(x) \begin{cases} \frac{-x^2 + x + 1}{x^2 + 1} \leq x \\ \frac{2x^2 - 2x + 1}{x^2 + 1} \leq x \end{cases}$$

2 
$$f(0) : 2f(0) \leq 4 \Rightarrow f(0) \leq 2 \Rightarrow f(0) \leq x^2 - 2x + 2 \Rightarrow f(0) \leq x^2 - 2x + 2$$

3 
$$yx - y \leq x^2 + x + 2 \Rightarrow x^2 + (1-y)x + (2+y) \leq 0$$
  

$$x \leq \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow y - 1 \pm \sqrt{(1-y)^2 - 4(2+y)} \Rightarrow (1-y)^2 - 4(2+y) \geq 0$$
  

$$y^2 + 1 - 2y - 8 - 4y \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0 \Rightarrow (y-7)(y+1) \geq 0 \Rightarrow y \leq -1 \vee y \geq 7$$
  

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

الف) 
$$\frac{-b}{2a} \leq \frac{\Delta}{4} \Rightarrow 2x \frac{2\Delta}{16} - \Delta x \frac{\Delta}{4} + 1 \leq \frac{2\Delta - \Delta_0 + 1}{1} \leq \frac{-14}{1} \Rightarrow R_f \leq [-14, +\infty)$$
  
 ب) 
$$\frac{-b}{2a} \leq \frac{\Delta}{4} \Rightarrow -9 + 4 - \Delta \leq 2 \Rightarrow \Delta \geq -7$$
  
 ج) 
$$R = \mathbb{R} \xrightarrow{\text{اصل رادیکال}} R = [-7, +\infty)$$
  
 د) 
$$R = (-\infty, +\infty) \Rightarrow R_f = \mathbb{R}$$

الف) 
$$R \leq \mathbb{R} - \left\{ \frac{3}{2} \right\}$$
  
 ب) 
$$R = \mathbb{R} - \{ \frac{3}{2} \} \xrightarrow{\text{اصل رادیکال}} R_f \leq [2, +\infty) - \left\{ \frac{3}{2} \right\}$$
  
 ج) 
$$y \leq \frac{x^2 + 4 + 1}{\sqrt{x^2 + 4}} \leq \sqrt{x^2 + 4} + \frac{1}{\sqrt{x^2 + 4}} \xrightarrow{\min(\sqrt{x^2 + 4}) = \sqrt{4}} R_f \leq \left[ \frac{4\sqrt{5}}{5}, +\infty \right)$$
  
 د) 
$$y \leq x^2 + 4 + \frac{1}{x^2 + 4} \xrightarrow{\min(x^2 + 4) = 4} R_f \leq \left[ \frac{1}{4}, +\infty \right)$$

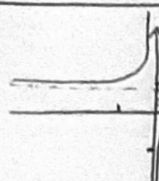
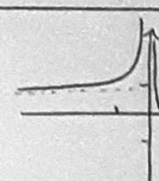
الف) 
$$yx^2 - y \leq x^2 + 4 \Rightarrow (x-y)x^2 + (4+y) \leq 0 \xrightarrow{y \neq x} x \leq \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{\pm \sqrt{4(y-3)(y+4)}}{2(y-3)}$$
  
 ب) 
$$x^2 \begin{cases} \xrightarrow{\min} 0 \rightarrow f(0) \leq -4 \\ \xrightarrow{\max} +\infty \rightarrow f(+\infty) \leq 3 \end{cases} \Rightarrow R_f \leq (-\infty, -4] \cup (3, +\infty)$$
  
 ج) 
$$y \leq -4 \vee y \geq 3 \Rightarrow R_f \leq (-\infty, -4] \cup (3, +\infty)$$

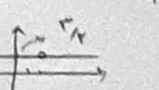
الف) 
$$\sin \omega \begin{cases} \xrightarrow{\min} -1 \rightarrow f(-1) \leq -1/2 \\ \xrightarrow{\max} 1 \rightarrow f(1) \leq -3 \end{cases} \Rightarrow R_f \leq [-3, -1/2]$$

ب)  $S \mid \begin{matrix} \uparrow \\ \downarrow \end{matrix} \Rightarrow R_y = \sqrt{[-\infty, 4]} = [0, 2]$

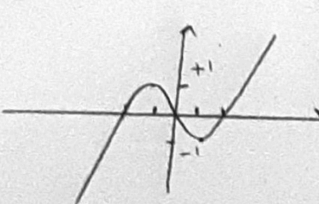
نیم دایره خانوار:  $A$  و  $B$  در  $[-\infty, +\infty]$  تعریف شده

۸

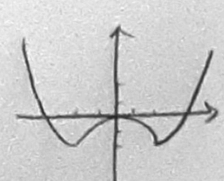
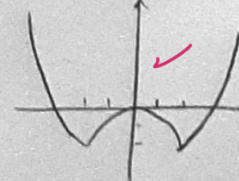
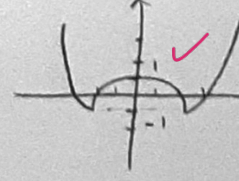
الف)  $\frac{x-1}{x}$   $\begin{cases} \text{مشتق: } x > 0 \\ \text{مشتق: } y < \frac{1}{x} \end{cases}$     $R_{fs} [0, +\infty)$

ب)  $y = \sqrt{\frac{9(x-2)}{x(x-2)}}$   $\Rightarrow R_{fs} \{ \frac{1}{2} \}$  (تابع در  $x=2$  تعریف نشده و در  $x=0$  تعریف نشده) 

۹

$\begin{cases} x^2 - 2x & x > 0 \\ 0 & x = 0 \\ -x^2 - 2x & x < 0 \end{cases}$    $\Rightarrow R_f = \mathbb{R}$

۱۰

$f(x)$    $f(|x|)$    $f(|x|)+1$    $|f(|x|)+1|$  