

نام و نام خانوادگی شناسنامه پاسنامه تشریحی تکلیف شماره کلاس روز بهم A

الف) $y = \frac{|x|+1}{|x|-2}$ $\begin{cases} \max |x| = +\infty \rightarrow y = 1 \text{ (1)} \\ \min |x| = 0 \rightarrow y = -\frac{1}{2} \text{ (2)} \end{cases}$

$|x|-2=0 \text{ (3)}$

بسته
 $\textcircled{1}, \textcircled{2}, \textcircled{3} \rightarrow y \in (-\infty, -\frac{1}{2}] \cup (1, +\infty)$

ب) $y = \frac{x^2+1}{|x|} = \frac{|x|^2+1}{|x|} = |x| + \frac{1}{|x|}$

$|x| > 0 \rightarrow y \in [2, +\infty) \checkmark$

(2)

1

$y = \frac{x^2+2x-2}{x+3} \rightarrow x^2+2x-2 = yx+3y \rightarrow x^2+(2-y)x-2-3y=0$

$\rightarrow x = \frac{y-2 \pm \sqrt{y^2+4y+12}}{2} \rightarrow y^2+4y+12 \geq 0 \rightarrow y \in (-\infty, -4] \cup [-2, +\infty) \checkmark$

(2)

2

$f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1} \rightarrow x^2-x+1 \neq 0 \rightarrow D_f \in \mathbb{R} \checkmark$

راه حل صغری آفندرو بجنون:

(1, 15)

$f(x) = \frac{x^2-x+1-\frac{x}{x}}{x^2-x+1} = 1 - \frac{x}{x(x^2-x+1)}, R_{\frac{x}{x^2-x+1}} \in [\frac{x}{x}, +\infty) \rightarrow R_{\frac{x}{x(x^2-x+1)}} \in [0, 1) \checkmark$

$\rightarrow R_f \in [0, 1) \checkmark$

چرا $y=1$ حذف شده: راه حل

3

الف) $y = \sqrt{-x^2+4x-1}$

$-x^2+4x-1 \rightarrow R \in (-\infty, -\frac{4}{2 \cdot (-1)}] \rightarrow R \in (-\infty, 2]$

$\rightarrow R_f \in \sqrt{(-\infty, 2]} \rightarrow R_f \in [0, \sqrt{2}] \checkmark$

ب) $y = \sqrt[3]{2x^2-11x}$

$2x^2-11x \rightarrow R \in [-\frac{11}{8}, +\infty) \rightarrow R \in [-1, +\infty)$

$\rightarrow R_f \in \sqrt[3]{[-1, +\infty)} \rightarrow R_f \in [-1, +\infty) \checkmark$

(2)

4

الف) $y = \log(x^2-x+1) \rightarrow x^2-x+1 \in \mathbb{R}$

$\rightarrow y \in \mathbb{R} \checkmark$

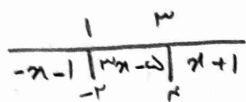
ب) $\log_y \frac{x^2+1}{x} \rightarrow \frac{x^2+1}{x} = x + \frac{1}{x} \rightarrow R \in [2, +\infty)$

$\rightarrow \log_y^{[2, +\infty)} \in [1, +\infty) \checkmark$

(2)

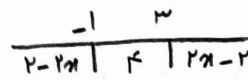
5

$$\text{الف) } y = |2x-2| - |x-2|$$



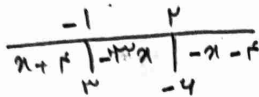
$$\left. \begin{array}{l} -x-1 \quad x < 1 \rightarrow y \in [-1, +\infty) \\ 2x-2 \quad 1 < x < 2 \rightarrow y \in [-1, 2) \\ x+1 \quad x > 2 \rightarrow y \in [3, +\infty) \end{array} \right\} R \in [-1, +\infty)$$

$$\text{ب) } y = |x-2| + |x+1|$$

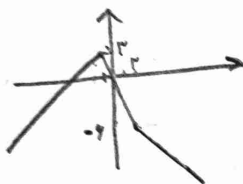


$$R \in [1, +\infty)$$

$$|x-2| - |2x+2| < 1$$

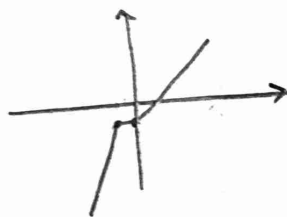
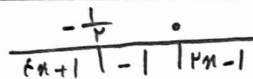


$$\begin{aligned} -2x &= 1 \rightarrow x = -\frac{1}{2} \\ x+2 &= 1 \rightarrow x = -1 \end{aligned}$$



$$x \in (-\infty, -1] \cup [-\frac{1}{2}, +\infty)$$

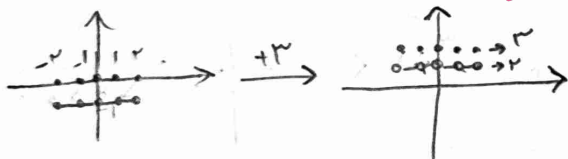
$$y = 2x - |2x+1| + |x|$$



$$\rightarrow R_f \in \mathbb{R}$$

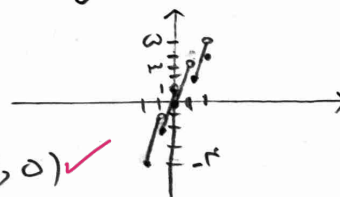
$$\text{الف) } y = [x] + [-x] + 2$$

$$[x] + [-x] \rightarrow R_f \in \{1, 2\}$$



$$\text{ب) } y = 2x - [x]$$

$$\begin{aligned} x \in [-1, -1) \rightarrow y = 2x+2 & \quad x \in [0, 1) \rightarrow y = 2x \\ x \in [-1, 0) \rightarrow y = 2x+1 & \quad x \in [1, 2) \rightarrow y = 2x-1 \end{aligned}$$



$$R_f \in [-1, 0)$$

$$\text{الف) } y = \sin^2 x - \sin x + 1$$

$$\begin{aligned} \max \sin x &= 1 \rightarrow y = 1 - 1 + 1 = 1 \\ \min \sin x &= -1 \rightarrow y = 1 + 1 + 1 = 3 \\ -\frac{b}{2a} &= \frac{1}{2} \rightarrow y = \frac{1}{4} - \frac{1}{4} + 1 = \frac{3}{4} \end{aligned} \left\} R_f \in [\frac{3}{4}, 3] \right.$$

$$\text{ب) } y = \sin^2 x + \sin^2 x + 1$$

$$\begin{aligned} \max \sin^2 x &= 1 \rightarrow y = 1 + 1 + 1 = 3 \\ \min \sin^2 x &= 0 \rightarrow y = 0 + 0 + 1 = 1 \end{aligned} \left\} R_f \in [1, 3] \right.$$

$$-\frac{b}{2a} = -\frac{1}{2} \rightarrow \text{تقریب نسته}$$

۳- مخدج کسر همواره مثبت است پس دامنه IR است

$$f(x) = \frac{(x - \frac{1}{4})^2}{(x - \frac{1}{4})^2 + \frac{3}{4}}$$

طرفین درمیان

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

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

$$\frac{0}{-} \quad \frac{1}{+} \quad \frac{-}{-} \Rightarrow y = [0, 1]$$

مخبر x نباید صفر شود یعنی $y \neq 1$ است

و تابع در انزای هیچ مقداری برابر یک نیست پس برد برابر است با: $R_y = [0, 1)$

$$f(x) = \frac{\square^2}{\square^2 + \frac{3}{4}} \quad \text{می‌توانست از روش مربع هم استفاده کنی}$$