

نام و نام خانوادگی شناسنامه شماره کلاس روز چهارم بهار پاسخنامه تشریحی تکلیف شماره A

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

$$|x|-2=0 \text{ ③}$$

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

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

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

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

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

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

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

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

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$$\text{الف) } y = \sqrt{-x^2+4x-1}$$

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

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

$$\text{ب) } y = \sqrt[3]{2x^2-11x}$$

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

$$\rightarrow R_f \in \sqrt[3]{[-11, +\infty)} \rightarrow R_f \in [-2, +\infty)$$

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

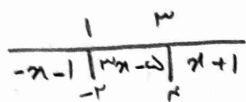
$$\rightarrow y \in \mathbb{R}$$

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

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

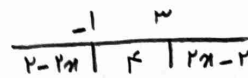
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$$\text{الف) } y = |2x-2| - |x-2|$$



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

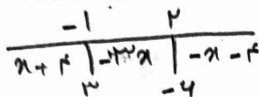
$$\text{ب) } y = |x-2| + |x+1|$$



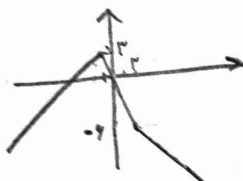
$$R \in [2, +\infty)$$

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



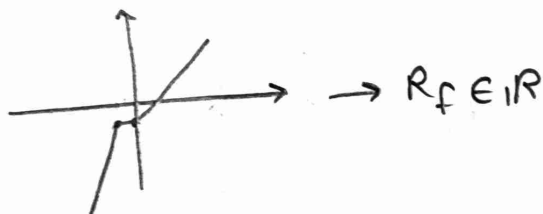
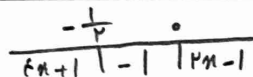
$$\begin{aligned} -2x &= 1 \rightarrow x = -\frac{1}{2} \\ x+2 &= 1 \rightarrow x = -1 \end{aligned}$$



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

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

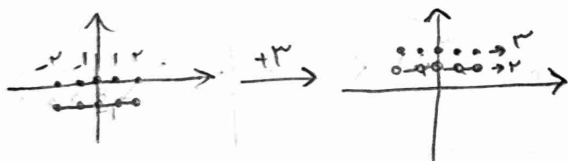


$$\rightarrow R_f \in \mathbb{R}$$

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$$\text{الف) } y = [x] + [-x] + 2$$

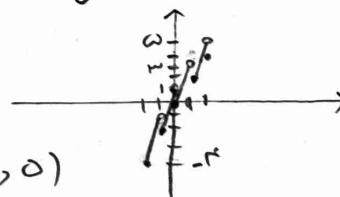
$$[x] + [-x] \rightarrow R_f \in \{2, 1\}$$



$$\text{ب) } y = 2x - [x]$$

$$x \in [-2, -1) \rightarrow y = 2x+2 \quad x \in [0, 1) \rightarrow y = 2x$$

$$x \in [-1, 0) \rightarrow y = 2x+1 \quad x \in [1, 2) \rightarrow y = 2x-1$$



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

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

$$\max \sin x = 1 \rightarrow y = 1 - 1 + 1 = 1$$

$$\min \sin x = -1 \rightarrow y = 1 + 1 + 1 = 3$$

$$-\frac{b}{2a} = \frac{1}{2} \rightarrow y = \frac{1}{4} - \frac{1}{4} + 1 = \frac{3}{4}$$

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

$$\max \sin^2 x = 1 \rightarrow y = 1 + 1 + 1 = 3$$

$$\min \sin^2 x = 0 \rightarrow y = 0 + 0 + 1 = 1$$

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

$$R_f \in [1, 3]$$

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