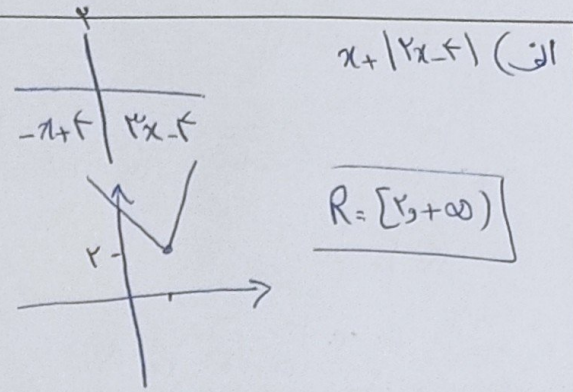
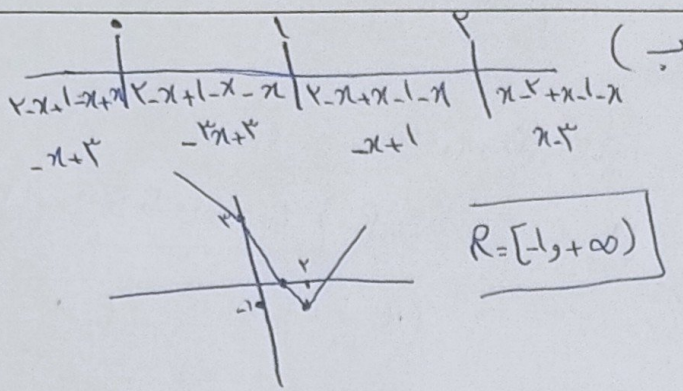
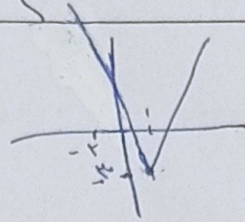
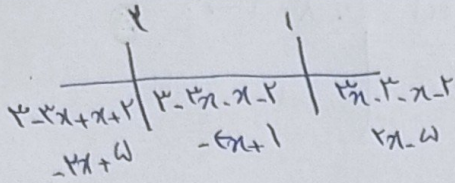




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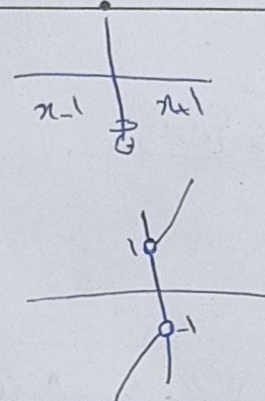
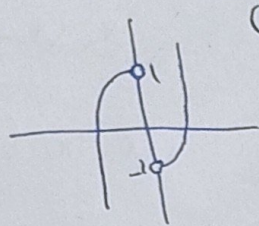
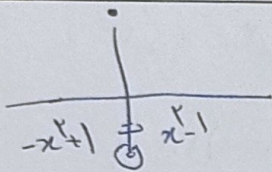
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$$\begin{cases} x = -1 \rightarrow k = 4 \\ x = 1 \rightarrow k = -3 \end{cases}$$

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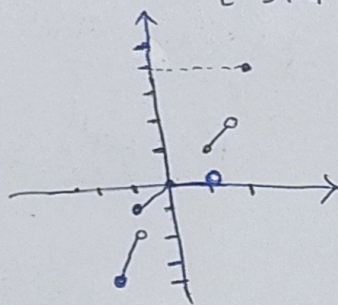


(الف) $x + \frac{x}{|x|}$

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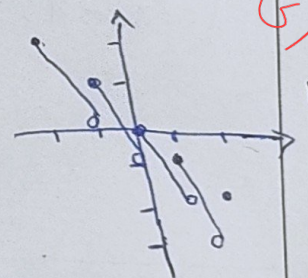
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$-2 \leq x < -1 \rightarrow 2x$
 $-1 \leq x < 0 \rightarrow x$
 $0 \leq x < 1 \rightarrow 0$
 $1 \leq x < 2 \rightarrow x$



(ب) $[x] |x|$

$-2 \leq x < -1 \rightarrow -2 - 2x$
 $-1 \leq x < 0 \rightarrow -1 - 2x$
 $0 \leq x < 1 \rightarrow -2x$
 $1 \leq x < 2 \rightarrow -1 - 2x$



(الف) $[x] - 2x$

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$f(x - f(x)) \rightarrow f(x - [x]) \rightarrow R = [0, 1)$

(ب) $f(x - [x]) \rightarrow R = [0, 1)$

(الف)

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$[2x] - 2x \rightarrow R = (-1, 0]$

(ج) $x - \omega\left[\frac{x}{\omega}\right] \rightarrow \omega\left(\frac{x}{\omega} - \left[\frac{x}{\omega}\right]\right)$

$R = [0, \omega)$

$\rightarrow R = [0, \omega)$

(ج)

$$-\sqrt{14+9} \leq r \sin x + r \cos x \leq \sqrt{14+9}$$

$$R = [-a, a]$$

$$(-) \rightarrow -\sqrt{9+4} \leq r \sin x + r \cos x \leq \sqrt{9+4}$$

$$R = [-\sqrt{13}, \sqrt{13}]$$

(الف)

5

6

$$\bullet \cos x - r \sin x \leq \sqrt{4+1} \quad \bullet (\cos x - r \sin x) \leq \frac{r}{\sqrt{2}}$$

$$R = [0, \frac{r}{\sqrt{2}}]$$

$$\sqrt{4+1} \leq r \sin x + r \cos x \leq \sqrt{4+1}$$

$$[r \sin x + r \cos x] \rightarrow R = \{-4, -3, -2, -1, 0, 1, 2, 3, 4\}$$

(ج)

$$r \sin x + r \sin x + r \begin{cases} x = \frac{b}{ra} = \frac{r}{r} \rightarrow y = \frac{r}{r} \\ \sin x = -1 \rightarrow y = 1 \\ \sin x = 1 \rightarrow y = r \end{cases}$$

$$R = [\frac{r}{r}, r]$$

(-)

$$\sin^2 x + r \sin x + r \begin{cases} x = \frac{b}{ra} = \frac{r}{r} \alpha \\ \sin x = -1 \rightarrow y = 0 \\ \sin x = 1 \rightarrow y = r \end{cases}$$

$$R = [0, r]$$

(الف)

5

7

$$\frac{r \cot x}{\frac{1}{\sin x}} = \frac{r \cos x}{\sin x} \times \sin x = r \cos x \sin x = \sin^2 x$$

$$-1 \leq \sin^2 x \leq 1$$

$$R = [-1, 1]$$

(-)

$$\sin^2 x + \cos^2 x + r \cos^2 x \rightarrow 1 + r \cos^2 x$$

$$\bullet \cos^2 x \leq 1 \rightarrow \bullet r \cos^2 x \leq r$$

$$1 \leq r \cos^2 x + 1 \leq r \rightarrow R = [1, r]$$

(الف)

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8

$$r^{1-\frac{1}{n}} \leq \sin^{\frac{1}{n}} x + \cos^{\frac{1}{n}} x \leq \frac{1}{r} \leq \sin^{\frac{1}{n}} x + \cos^{\frac{1}{n}} x \leq 1$$

$$[\sin^{\frac{1}{n}} x + \cos^{\frac{1}{n}} x] \leq 1$$

$$R = \{0, 1\}$$

(-)

$$r^{1-\frac{1}{n}} \leq \sin^{\frac{1}{n}} x + \cos^{\frac{1}{n}} x \leq 1$$

$$\frac{1}{r} \leq \sin^{\frac{1}{n}} x + \cos^{\frac{1}{n}} x \leq 1$$

$$R = [\frac{1}{r}, 1]$$

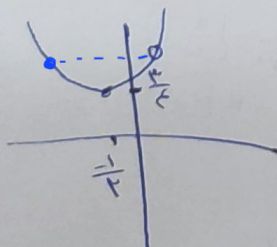
(الف)

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9

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

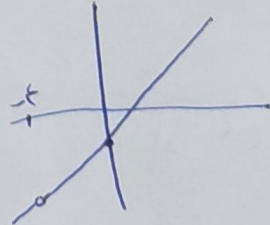
$$x = \frac{b}{ra} = \frac{1}{r} \rightarrow y = \frac{r}{r}$$



$$R = [\frac{r}{r}, +\infty) - \{r\}$$

(-)

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



$$R = \mathbb{R} - \{-1\}$$

(الف)

1, 10

10