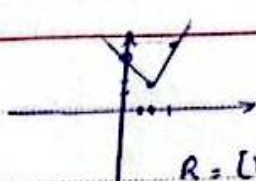


کتاب شماره ۷

بزرگم و صغیرانه B

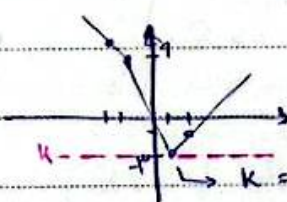
۱۸، ۱۶

بزرگم و صغیرانه

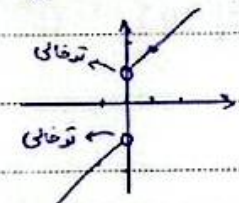
الف) $y = x + \frac{|x-2|}{x-2}$ $\Rightarrow$ $\frac{2}{-x+2}$ $\frac{2}{x-2}$ $x=2 \rightarrow y=5$ $x=0 \rightarrow y=4$  ۵

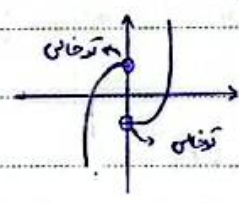
ب) $y = |x-2| + |x-1| - |x|$ $\Rightarrow$ $\frac{0}{-x+2}$ $\frac{1}{-x+1}$ $\frac{1}{-x}$ $\frac{2}{x-2}$ $\frac{1}{x-1}$ $\frac{1}{x}$  ۵

$x=2 \rightarrow 0$
 $x=-1 \rightarrow 0$

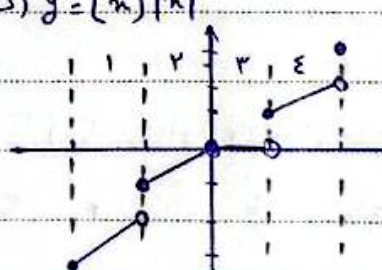
۲. ا. بیشه در $k =$ مقدار k واقع در یک نقطه مشترک هستند.  ۵

$\frac{-2}{-x+2}$ $\frac{1}{-x+1}$ $\frac{2}{x-2}$ $\frac{1}{x-1}$ $\frac{1}{x}$ $x=2 \rightarrow -1$ $x=-3 \rightarrow 11$

الف) $y = x + \frac{x}{n}$  ۵

ب) $y = x|n| - \frac{n}{|n|}$  ۵

الف) $y = [x] - 2x$  ۵

ب) $y = [x]|n|$  ۵

$1 \rightarrow -2 - 2x$
 $2 \rightarrow -1 - 2x$
 $3 \rightarrow 0 - 2x = -2x$
 $4 \rightarrow 1 - 2x$
 $x=2 \rightarrow -2$

$1 \rightarrow -2|n|$
 $2 \rightarrow -1|n|$
 $3 \rightarrow 0$
 $4 \rightarrow 1|n|$
 $x=2 \rightarrow 2$

الف) $y = x_n - [x_n] \rightarrow R = [0, 1)$ ۵

ب) $y = f_n - f[x_n] = f(\underbrace{x_n - [x_n]}_{[0, 1)}) \rightarrow [0, f)$

$$c) y = n - a \left[\frac{n}{a} \right] = a \left(\frac{n}{a} - \left[\frac{n}{a} \right] \right) \rightarrow R = [0, a)$$

$$d) y = [x_n] - x_n = - \underbrace{(x_n - [x_n])}_{[0, 1)} \rightarrow R = (-1, 0]$$

$$-\sqrt{a^2 + b^2} \leq a \sin n + b \cos n \leq \sqrt{a^2 + b^2} \quad -4$$

$$i) y = r \sin n + r \cos n \rightarrow -\sqrt{1^2 + 1^2} \leq y \leq \sqrt{1^2 + 1^2} \Rightarrow R = [-\sqrt{2}, \sqrt{2}]$$

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$$ii) y = r \sin n - r \cos n \rightarrow -\sqrt{r^2 + r^2} \leq y \leq \sqrt{r^2 + r^2} \Rightarrow R = [-r, r]$$

$$e) y = [r \sin n + a \cos n] \xrightarrow{t} -\sqrt{r^2 + a^2} \leq t \leq \sqrt{r^2 + a^2} \Rightarrow R = \left\{ \begin{matrix} -\sqrt{r^2 + a^2} \\ -\sqrt{r^2 + a^2} - \epsilon \\ \vdots \\ \sqrt{r^2 + a^2} \end{matrix} \right\} \Rightarrow R = \{-4, -2, \dots, 2\}$$

$$f) y = \sqrt{\cos n - r \sin n} \xrightarrow{t} -\sqrt{a} \leq t \leq \sqrt{a} \Rightarrow R = [0, \sqrt{a}]$$

$$iii) \sin^2 n + r \sin n + r$$

$$\sin n = 1 \rightarrow y = 4 \quad \sin n = \frac{-b}{r} = \frac{-r}{r} = -1 \rightarrow y = \frac{-1}{r} \Rightarrow R = \left[\frac{-1}{r}, 4 \right]$$

$$\sin n = -1 \rightarrow y = 0$$

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$$iv) r \sin^2 n + r \sin n + r$$

$$\sin n = 1 \rightarrow y = v \quad \sin n = \frac{-b}{r} = \frac{-r}{r} = -1 \rightarrow y = \frac{v}{r} \Rightarrow R = \left[\frac{v}{r}, v \right]$$

$$\sin n = -1 \rightarrow y = 1$$

$$v) y = \sin^2 n + r \cos^2 n = \sin^2 n + r(1 - \sin^2 n) = -r \sin^2 n + r$$

$$\sin^2 n = 1 \rightarrow 1 \quad \sin n = \frac{-b}{r} = 0 \rightarrow r \Rightarrow R = [1, r]$$

5

$$vi) y = \frac{r \cot n}{1 + \cot^2 n} = \frac{r \cos n}{\sin n} \times \sin^2 n = r \sin n \cos n = \sin^2 n \Rightarrow R = [-1, 1]$$

$$(a) y = \sin^k n + \cos^k n$$

$$1-k \leq \sin^k n + \cos^k n \leq 1 \quad -9$$

$$k=3 \rightarrow \frac{1}{8} \leq y \leq 1 \Rightarrow R = \left[\frac{1}{8}, 1\right]$$

5

$$(b) y = [\sin^k n + \cos^k n]$$

$$k=2 \rightarrow \frac{1}{2} \leq \sin^2 n + \cos^2 n \leq 1 \Rightarrow \frac{1}{2} \leq \sin^2 n + \cos^2 n \leq 1 \xrightarrow{\text{بالتالي}} R = \{0, 1\}$$

$$(c) y = \frac{1}{n^2} + \frac{1}{n} - \varepsilon$$

$$\frac{1}{n^2} + \frac{1}{n} - \varepsilon \mid \frac{1}{n-1} \Rightarrow \text{if } n = -\varepsilon \rightarrow y = \frac{1}{(-\varepsilon)^2} + \frac{1}{-\varepsilon} - \varepsilon = -9 \Rightarrow R = \mathbb{R} - \{-9\}$$

1, 2, 5 -10

$$(d) \frac{n-1}{n-1} = \frac{(n-1)(n^2+1+n)}{1 \cdot n+1} = n^2 + n + 1$$

$$\text{if } n=1 \rightarrow y=3 \Rightarrow R = \mathbb{R} - \{3\}$$

$$R = \left[\frac{1}{n}, +\infty\right)$$

