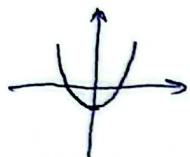


الف) $\begin{cases} y_1^r = 2x_1^r - 1 \\ y_r^r = 2x_r^r - 1 \end{cases} \xrightarrow{x_1=x_r} y_1^r = y_r^r \Rightarrow y_1 = y_r$ تابع است ✓

ب) $\begin{cases} y_1^r + y_r^r = 2x_1^r - 1 \\ y_r^r + y_r^r = 2x_r^r - 1 \end{cases} \xrightarrow{x_1=x_r} y_1^r + y_r^r = y_r^r + y_r^r \Rightarrow y_1^r - y_r^r + y_1^r - y_r^r = 0 \Rightarrow$

$\Rightarrow (y_1 - y_r)(y_1^r + y_1 y_r + y_r^r + 1) = 0 \Rightarrow (y_1 - y_r) \underbrace{(y_1^r + y_1 y_r + y_r^r + 1)}_{\text{همیشه مثبت}} = 0 \Rightarrow y_1 - y_r = 0 \Rightarrow y_1 = y_r$ تابع است ✓

الف) $|y| + xy = x + 1 \xrightarrow{x=0} |y| = 1 \Rightarrow y = \pm 1$ تابع نیست ✗



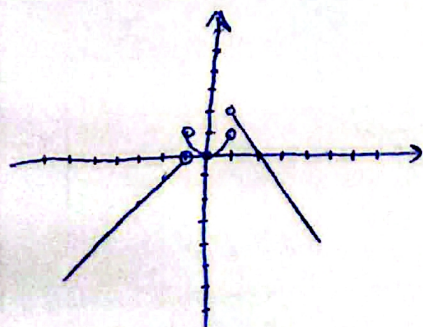
ج) $\begin{cases} y_1^r = -x_1^r + 2x_1 - 1 \\ y_r^r = -x_r^r + 2x_r - 1 \end{cases} \xrightarrow{x_1=x_r} y_1^r = y_r^r \Rightarrow y_1 = y_r$ تابع است ✓

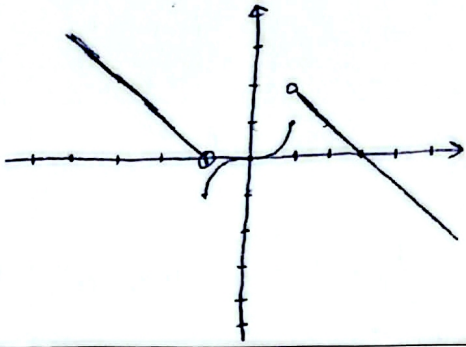
الف) $\begin{cases} \sin \frac{\pi}{3} = \frac{\sqrt{3}}{2} \\ \cos \frac{\pi}{3} = \frac{1}{2} \end{cases} \Rightarrow \tan \frac{\pi}{3} = \frac{\sqrt{3}}{1} = \sqrt{3}$ ب) $\begin{cases} \sin \frac{\sqrt{3}\pi}{6} = -\frac{1}{2} \\ \cos \frac{\sqrt{3}\pi}{6} = \frac{\sqrt{3}}{2} \end{cases} \Rightarrow \cot \frac{\sqrt{3}\pi}{6} = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$

ج) $\begin{cases} \sin 330^\circ = -\frac{1}{2} \\ \cos 330^\circ = \frac{\sqrt{3}}{2} \end{cases} \Rightarrow \tan 330^\circ = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$ د) $\sin 180^\circ = 0 \Rightarrow \cot 180^\circ = \text{تعریف نشده}$

الف) $\sin \alpha = \frac{1}{2} \Rightarrow \alpha = \frac{\pi}{6}, \frac{5\pi}{6}$

ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = \frac{\pi}{4}, \frac{7\pi}{4}$





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الف) $y = (n-r)(n-r)(n-r)$

$$\begin{array}{c} r & r & r \\ - & + & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

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ب) $y = (n-r)(n-r)^*(n-r)$

$$\begin{array}{c} r & r^* & r \\ + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

الف) $y = \frac{(n-r)(n-r)}{n-r}$

$$\begin{array}{c} r & r & r \\ - & + & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

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ب) $\frac{(n-r)(n-r)}{(n-r)^r}$

$$\begin{array}{c} r & r^* & r \\ + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

الف) $y = \frac{n^r - rn + r}{n-r} = \frac{n^r - rn + r}{n-r} \cdot \frac{n-1}{n-1} = \frac{(n-1)(n-r)}{(n-1)(n-r)}$

$$\begin{array}{c} r & r^* & r \\ + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

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ب) $y = \frac{n^r - rn + r}{n-r} = \frac{(n-1)(n-r)}{(n-1)(n-r)}$

$$\begin{array}{c} r^* & r & r \\ + & + & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

الف) $y = \frac{n^r(n-1)(n+1)}{n^r + n + r}$

$$\begin{array}{c} -1 & r^* & 1 \\ + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

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~~$y = \frac{n^r(n-1)(n+1)}{n^r + n + r}$~~

ب) $\frac{n^r + rn + r}{n^r + 2n + r} \rightarrow \Delta < 0$

چون دلتا در صورت و مخرج کمتر از ۰ است
بنابراین عبارت همیشه مثبت است