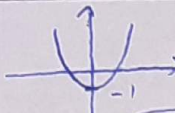


الف) $y = 2x - 1$
 $\rightarrow \begin{cases} y_1 = 2x_1 - 1 \\ y_2 = 2x_2 - 1 \end{cases}$
 $x_1 = x_2 \rightarrow y_1 = y_2$
 $\Rightarrow y_1 = y_2$ ✓
 تابع است

ب) $x + y = 3x^2 - 1 \rightarrow \begin{cases} x_1 + y_1 = 3x_1^2 - 1 \\ x_2 + y_2 = 3x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1 + y_1 = y_2 + y_2 \rightarrow y_1 - y_2 + y_1 - y_2 = 0$
 $\rightarrow (y_1 - y_2)(y_1 + y_2 + y_2 + y_2) + (y_1 - y_2) = 0 \rightarrow (y_1 - y_2)(y_1 + y_2 + y_2 + 1) = 0$
 $\Rightarrow \begin{cases} y_1 - y_2 = 0 \Rightarrow y_1 = y_2 \\ y_1 + y_2 + y_2 + 1 = 0 \end{cases}$
 $\Delta = b^2 - 4ac = y_2^2 - 4(y_2 + 1) = -4y_2 - 4$
 $\Delta < 0$ عبارت
 ریشه ندارد
 $y_1 = y_2$
 تابع است

الف) $y = x^2 - 1$ ✓

 فضا سازی محور و نمودار
 را در حد اکثر یک نقطه
 قطع می کند
 برای هر یک از این دو تابع
 تابع است

ب) $|x| + y = x^2 + 1 \xrightarrow{x=0} |x| + 0 = 0 + 1$
 $|x| = 1 \rightarrow y = \pm 1$
 یک x دارد
 تابع نیست

ج) $y^3 + x^3 = 2x - 1 \rightarrow \begin{cases} y_1^3 + x_1^3 = 2x_1 - 1 \\ y_2^3 + x_2^3 = 2x_2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 + x_1^3 = y_2^3 + x_2^3$
 $y_1^3 = y_2^3 \Rightarrow y_1 = y_2$
 تابع است

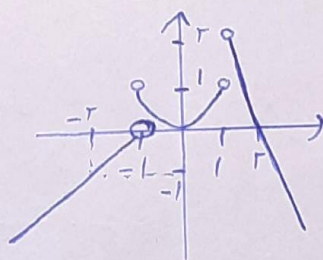
د) $\sqrt{y} + \sqrt{x} = 2 \rightarrow \begin{cases} \sqrt{y_1} + \sqrt{x_1} = 2 \\ \sqrt{y_2} + \sqrt{x_2} = 2 \end{cases} \xrightarrow{x_1 = x_2} \sqrt{y_1} = \sqrt{y_2} \Rightarrow y_1 = y_2$
 تابع است

الف) $\tan \frac{\pi}{4} \quad \frac{\pi}{4} = 45^\circ \quad \tan 45^\circ = \frac{\sin 45^\circ}{\cos 45^\circ} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$ ✓
 ب) $\cot \frac{\pi}{5} \quad \frac{\pi}{5} = 36^\circ \quad \cot 36^\circ = \frac{\cos 36^\circ}{\sin 36^\circ} = \frac{\frac{\sqrt{5}+1}{4}}{\frac{\sqrt{10-2\sqrt{5}}}{4}} = \frac{\sqrt{5}+1}{\sqrt{10-2\sqrt{5}}}$ ✓

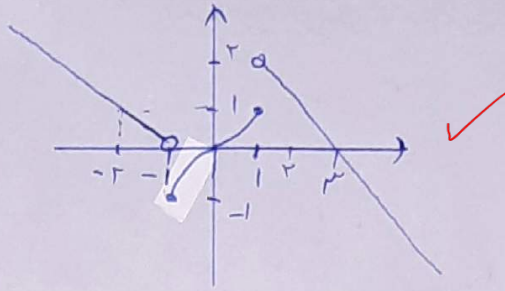
ج) $\tan 135^\circ = \frac{\sin 135^\circ}{\cos 135^\circ} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$ ✓
 د) $\cot 180^\circ = \frac{\cos 180^\circ}{\sin 180^\circ} = \frac{-1}{0}$ تعریف نمی شود ✓

الف) $\sin \alpha = \frac{1}{\sqrt{2}} \Rightarrow \alpha = 45^\circ \text{ و } 135^\circ = \frac{\pi}{4} \text{ و } \frac{3\pi}{4}$ ✓
 ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = 45^\circ \text{ و } 315^\circ = \frac{\pi}{4} \text{ و } \frac{7\pi}{4}$ ✓

$f(x) = \begin{cases} -2x + 1 & x > 0 \\ x^2 & -1 \leq x \leq 1 \\ x + 1 & x < -1 \end{cases}$

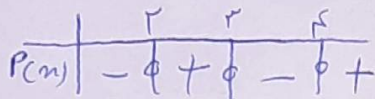


$$f(n) = \begin{cases} -n+3 & n > 1 \\ n^2 & -1 \leq n \leq 1 \\ -n-1 & n < -1 \end{cases}$$



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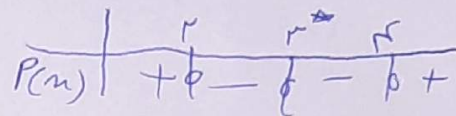
الف) $y = (n-2)(n-3)(n-4)$
 $n-2=0 \quad n-3=0 \quad n-4=0$
 $n=2 \quad n=3 \quad n=4$



✓

ب) $y = (n-2)(n-3)^2(n-4)$
 $n-2=0 \quad (n-3)^2 \quad n-4=0$
 $n=2 \quad n=3 \quad n=4$

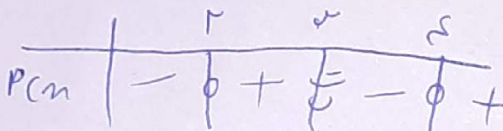
مضاعف
چون توان زوج دارد



✓

۷

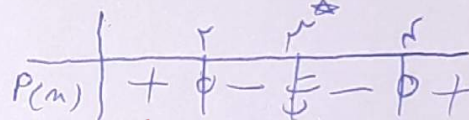
الف) $y = \frac{(n-2)(n-4)}{n-3}$
 $n-2=0 \quad n < 2$
 $n-4=0 \quad n=4$
 $n-3=0 \quad n=3$



✓

ب) $y = \frac{(n-2)(n-4)}{(n-3)^2}$
 $n-2=0 \quad n=2$
 $n-4=0 \quad n=4$
 $(n-3)^2=0 \quad n=3$

مضاعف چون توان زوج دارد



✓

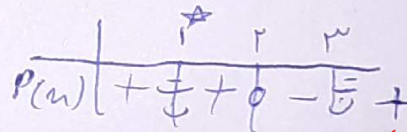
۸

الف) $\frac{n^2-3n+2}{n-3}$
 $n^2-3n+2 = (n-2)(n-1)$
 $\frac{n^2-3n+2}{n-3} = \frac{(n-2)(n-1)}{n-3}$
 $n^2-3n+2 = (n-2)(n-1)$
 $\frac{n^2-3n+2}{n-3} = \frac{(n-2)(n-1)}{n-3}$



✓

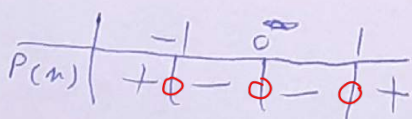
ب) $\frac{n^2-3n+2}{n^2-4n+3} = \frac{(n-2)(n-1)}{(n-3)(n-1)}$
 $\frac{n^2-3n+2}{n^2-4n+3} = \frac{(n-2)(n-1)}{(n-3)(n-1)}$



✓

۹

الف) $y = \frac{n^2-2n}{n^2+n+2}$
 $n^2-2n = n(n-2)$
 $n^2+n+2 = (n+2)(n-1)$
 $\frac{n^2-2n}{n^2+n+2} = \frac{n(n-2)}{(n+2)(n-1)}$
 $\Delta = b^2-4ac = 1-4(2 \times 1) = -7$
 $\Delta < 0$ همیشه ندارد



ب) $\frac{n^2+3n+2}{n^2+2n+3}$
 $\Delta = b^2-4ac = 9-4(2 \times 3) = -15$
 $\Delta < 0$ همیشه ندارد

عبارت همیشه مثبت است

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