

الف) $y^2 = 2x^2 - 1 \rightarrow y_1^2 = 2x_1^2 - 1, y_2^2 = 2x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2 \rightarrow$ تابع است

ب) $y^2 + y = 2x^2 - 1 \rightarrow y_1^2 + y_1 = 2x_1^2 - 1, y_2^2 + y_2 = 2x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1^2 + y_1 = y_2^2 + y_2 \rightarrow y_1^2 - y_2^2 + y_1 - y_2 = 0$
 $y_1^2 + y_2 = 2x_2^2 - 1$

$(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0 \rightarrow y_1 - y_2 = 0 \rightarrow y_1 = y_2$
 $y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow$ ریشه ندارد

الف) $y = x^2 - 1 \rightarrow y_1 = x_1^2 - 1, y_2 = x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1 = y_2 \rightarrow$ تابع است

ب) $|y| + xy = x^2 + 1 \xrightarrow{x=0} |y| = 1 \rightarrow y = 1, y = -1 \rightarrow$ تابع نیست

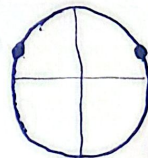
ج) $y^2 + x^2 = 2x - 1 \rightarrow y^2 = -x^2 + 2x - 1 \rightarrow y_1^2 = -x_1^2 + 2x_1 - 1, y_2^2 = -x_2^2 + 2x_2 - 1 \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2 \rightarrow$ تابع است

د) $\sqrt{y} + \sqrt{x} = 2 \rightarrow \sqrt{y} = 2 - \sqrt{x} \rightarrow \sqrt{y_1} = 2 - \sqrt{x_1}, \sqrt{y_2} = 2 - \sqrt{x_2} \xrightarrow{x_1 = x_2} \sqrt{y_1} = \sqrt{y_2} \rightarrow y_1 = y_2 \rightarrow$ تابع است

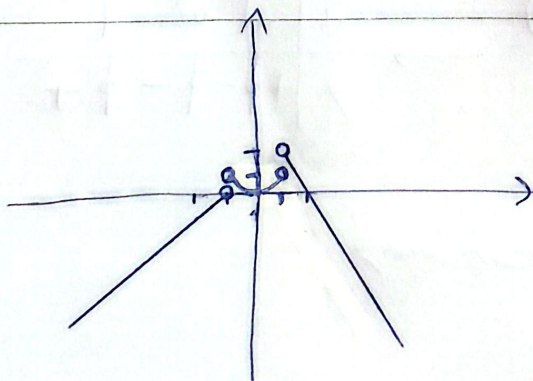
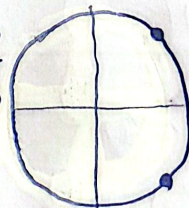
الف) $\tan \frac{\pi}{3} \rightarrow \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$ ب) $\cot \frac{\sqrt{\pi}}{6} \rightarrow \frac{\cos 11.0^\circ}{\sin 11.0^\circ} = \frac{\frac{-\sqrt{3}}{2}}{\frac{-1}{2}} = \sqrt{3}$

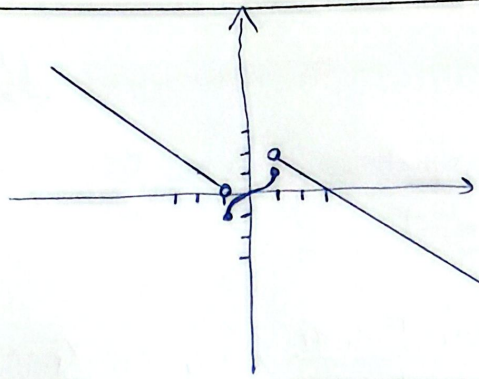
ج) $\tan 45^\circ \rightarrow \frac{\sin 45^\circ}{\cos 45^\circ} = \frac{\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = 1$ د) $\cot 110^\circ \rightarrow \frac{\cos 110^\circ}{\sin 110^\circ} = \frac{-1}{0} \rightarrow$ تعریف نشده

الف) $\sin a = \frac{1}{2} \rightarrow a = \left\{ 2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right\}$



ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow a = \left\{ 2k\pi + \frac{\pi}{4}, 2k\pi - \frac{\pi}{4} \right\}$





$$\text{الف) } y = (x-1)(x-2)(x-3) \rightarrow \begin{array}{c|cccc} x & 1 & 2 & 3 & 4 \\ \hline y & - & + & - & + \end{array}$$

$$\text{ب) } y = (x-1)(x-2)^2(x-3) \rightarrow \begin{array}{c|cccc} x & 1 & 2 & 3^* & 4 \\ \hline y & + & - & - & + \end{array}$$

$$\text{الف) } y = \frac{(x-1)(x-3)}{x-2} \rightarrow \begin{array}{c|cccc} x & 1 & 2 & 3 & 4 \\ \hline y & - & + & - & + \end{array}$$

$$\text{ب) } y = \frac{(x-1)(x-3)}{(x-2)^2} \rightarrow \begin{array}{c|cccc} x & 1 & 2^* & 3 & 4 \\ \hline y & + & - & - & + \end{array}$$

$$\text{الف) } y = \frac{x^2-2x+1}{x-3} = \frac{(x-1)^2(x+1)}{x-3} \rightarrow \begin{array}{c|cccc} x & -1 & 1^* & 2 & 3 \\ \hline y & + & - & - & + \end{array}$$

$$\text{ب) } y = \frac{x^2-2x+1}{x^2-4x+3} = \frac{(x-1)(x-1)}{(x-1)(x-3)} \rightarrow \begin{array}{c|cccc} x & 1^* & 2 & 3 & 4 \\ \hline y & + & - & - & + \end{array}$$

$$\text{الف) } y = \frac{x^2-x^2}{x^2+x+2} = \frac{0}{x^2+x+2} \rightarrow \begin{array}{c|cccc} x & -1 & 0^* & 1 & 2 \\ \hline y & + & - & - & + \end{array}$$

$$\text{ب) } y = \frac{x^2+2x+1}{x^2+1x+2} \rightarrow \text{y دالة ثابتة}$$