

الف) $y^2 = 2x - 1 \rightarrow \begin{cases} y_1^2 = 2x_1 - 1 \\ y_2^2 = 2x_2 - 1 \end{cases} \xrightarrow{m_1 = m_2} y_1^2 = y_2^2 \Rightarrow \boxed{y_1 = y_2}$ تابع است

ب) $y^2 + y = 2x - 1 \rightarrow \begin{cases} y_1^2 + y_1 = 2x_1 - 1 \\ y_2^2 + y_2 = 2x_2 - 1 \end{cases} \xrightarrow{m_1 = m_2} y_1^2 + y_1 = y_2^2 + y_2 \rightarrow y_1^2 - y_2^2 + y_1 - y_2 = 0$

$\rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0 \xrightarrow{\text{تفکیک}} (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$

$\Rightarrow \begin{cases} y_1 - y_2 = 0 \rightarrow \boxed{y_1 = y_2} \checkmark \end{cases}$

$a = y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow y_1 = \frac{-y_2 \pm \sqrt{\Delta}}{2} \rightarrow \Delta = y_2^2 - 4(y_2^2 + 1) = y_2^2 - 4y_2^2 - 4 = -3y_2^2 - 4$
 $y_1 = \frac{-y_2 \pm \sqrt{-3y_2^2 - 4}}{2} \xrightarrow{\Delta < 0} \text{پس این معادله را برقرار نیست}$ تابع است

الف) $y = x^2 - 1$

تابع است

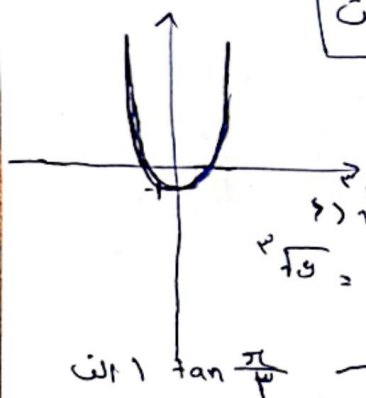
ب) $|y| + x y = x^2 + 1$

$\xrightarrow{m_1 = m_2} |y| = 1 \Rightarrow \boxed{y = \pm 1}$ تابع نیست

ج) $y^3 + x^3 = 2x - 1$

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

$\xrightarrow{m_1 = m_2} y_1^3 = y_2^3 \Rightarrow \boxed{y_1 = y_2}$



$\sqrt{y} + \sqrt{x} = 2 \rightarrow \sqrt{y} = 2 - \sqrt{x} \Rightarrow \begin{cases} \sqrt{y_1} = 2 - \sqrt{x_1} \\ \sqrt{y_2} = 2 - \sqrt{x_2} \end{cases} \xrightarrow{m_1 = m_2} \sqrt{y_1} = \sqrt{y_2} \Rightarrow \boxed{y_1 = y_2}$ تابع است

الف) $\tan \frac{\pi}{4}$

ب) $\cot \frac{5\pi}{4}$

ج) $\tan 135^\circ$

د) $\cot 180^\circ$

$\rightarrow \frac{\sin 135^\circ}{\cos 135^\circ} = \frac{\frac{1}{\sqrt{2}}}{-\frac{1}{\sqrt{2}}} = \boxed{-1}$

$\frac{\sin 90^\circ}{\cos 90^\circ} = \frac{1}{0} = \boxed{+\infty}$
 $\frac{\cos 180^\circ}{\sin 180^\circ} = \frac{-1}{0} = \boxed{-\infty}$

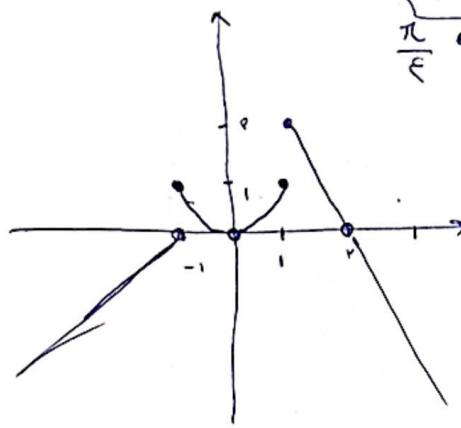
الف) $\sin a = \frac{1}{2}$

$\left\{ a = 30^\circ, 150^\circ \right\} \rightarrow \frac{\pi}{6}$

ب) $\cos a = \frac{\sqrt{2}}{2}$

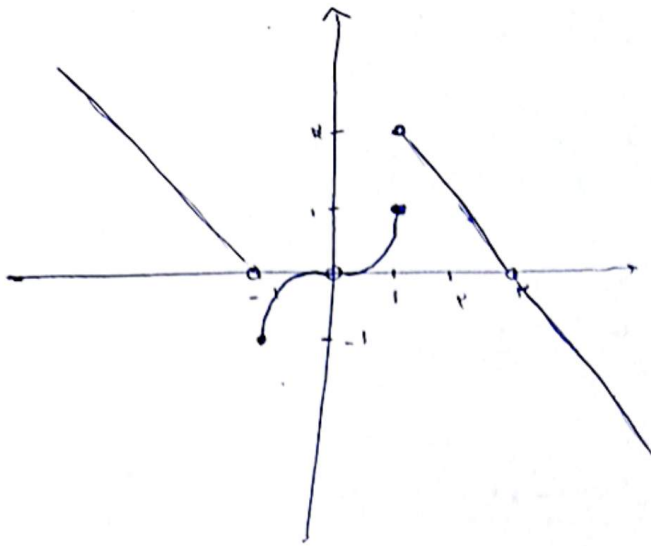
$\left\{ a = 45^\circ, 135^\circ \right\} \rightarrow \frac{\pi}{4}, \frac{3\pi}{4}$

$0 \leq a < 2\pi$



$f(x) = \begin{cases} -2x + 4 & x > 1 \\ x^2 & -1 < x < 1 \\ x + 1 & x < -1 \end{cases}$

الف) $y = -2x + 4 \quad \{ x > 1 \}$
 ب) $y = x^2 \quad \{ -1 < x < 1 \}$
 ج) $y = x + 1 \quad \{ x < -1 \}$



$$\begin{cases} -n+3 & n > 1 \\ n & -1 \leq n \leq 1 \\ -n-1 & n < -1 \end{cases}$$

$$y = -n+3 \quad n > 1$$

$$y = n^3 \quad -1 \leq n \leq 1$$

$$y = -n-1 \quad n < -1$$

نقطه توقفی

$$y = (n-2)(n-3)(n-4) = 0$$

$$\Rightarrow \frac{2}{-} \frac{3}{+} \frac{4}{-}$$

-V

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

$$\frac{2}{+} \frac{3}{-} \frac{4}{-}$$

-A

$$y = (n-2)(n-3) = 0 \Rightarrow n = 2, 3$$

$$\frac{2}{-} \frac{3}{+}$$

$$y = \frac{(n-2)(n-3)}{(n-2)^2} = \frac{n-3}{n-2}$$

$$\frac{2}{+} \frac{3}{-}$$

$$y = \frac{n^2 - 3n + 2}{n^2 - 2n + 1} = 0 \Rightarrow n = 1, 2$$

$$\frac{-2}{-} \frac{1}{+}$$

-9

$$y = \frac{(n-2)(n-3)}{(n-1)(n-2)} = 0 \Rightarrow n = 1, 3$$

$$\frac{1}{+} \frac{2}{-} \frac{3}{+}$$

$$y = \frac{n^2 - 3n + 2}{n^2 - 2n + 1}$$

$$(n-2)(n-1) = 0 \Rightarrow n = 1, 2$$

$$y = \frac{n^2 - 1}{n^2 + 2n + 1} = 0 \Rightarrow n = 0, 1$$

$$\frac{-1}{-} \frac{0}{+} \frac{1}{-}$$

-10

$$1 - f(x) = -V \Rightarrow 9 - f(1)(t) = -V$$

$$y = \frac{n^2 + 2n + 1}{n^2 + 2n + 1} = 1$$

$$y = \frac{n^2 + 2n + 1}{n^2 + 2n + 1} = 1$$

$$\Rightarrow y > 0$$

$$n \in \mathbb{R}$$