

الف) $y^3 = x^3 - 1$ تابع است $\rightarrow$ شکل



ب) $y^3 + y = x^3 - 1$ تابع است $\rightarrow$



الف) $y = x^3 - 1$ تابع است



ب) $|y| + y = x^3 + 1$ تابع نیست $\rightarrow x = 0 \Rightarrow |y| = 1 \Rightarrow \begin{cases} y = 1 \\ y = -1 \end{cases}$

ج) $y^3 + x^3 = x^3 - 1$ تابع است $\rightarrow \begin{cases} y^3 + x^3 = x^3 - 1 \\ y^3 + x^3 = x^3 - 1 \end{cases} \Rightarrow y^3 = -1 \Rightarrow y = -1$

د) $\sqrt[3]{y} + \sqrt[3]{x} = 1$ رساندن به توان $\rightarrow y + x = 1 \Rightarrow y = -x + 1$ تابع خطی

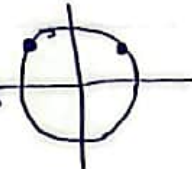
الف) $\tan \frac{\pi}{3} \rightarrow \tan 60^\circ = \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

ب) $\cot \frac{\pi}{4} \rightarrow \cot 45^\circ = \frac{\cos 45^\circ}{\sin 45^\circ} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$

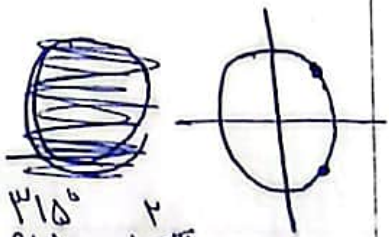
ج) $\tan 135^\circ \rightarrow \frac{\sin 135^\circ}{\cos 135^\circ} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$

د) $\cot 180^\circ \rightarrow \frac{\cos 180^\circ}{\sin 180^\circ} = \frac{-1}{0} = \text{undefined}$

الف) $\sin \alpha = \frac{1}{2} \rightarrow \alpha = \left\{ \frac{\pi}{6}, \frac{5\pi}{6} \right\} \rightarrow \alpha = 30^\circ, 150^\circ$

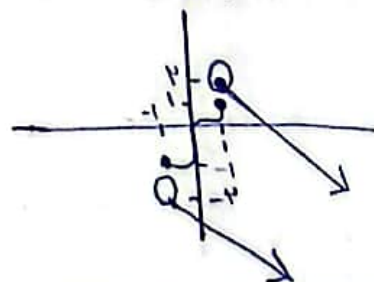


ب) $\cos \alpha = \frac{\sqrt{2}}{2} \rightarrow \alpha = \left\{ \frac{\pi}{4}, \frac{7\pi}{4} \right\}$

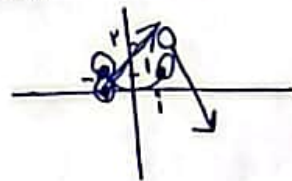


$f(x) = \begin{cases} -x+1 & x > 1 \\ x^3 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases} \rightarrow f(2) = -2+1 = -1, f(1) = 1, f(-1) = -1$

$f(x) = -x-1 \rightarrow f(-1) = -(-1)-1 = 0$



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



الف) $y = (x-1)(x-3)(x-5)$

$$\begin{array}{c} 2 \quad 3 \quad 5 \\ - \phi + \phi - \phi + \end{array} \rightarrow D_f = \mathbb{R}$$

ب) $y = (x-1)(x-3)^2(x-5)$

$$\begin{array}{c} 2 \quad 3 \quad 5 \\ + \phi - \phi - \phi + \end{array} \rightarrow D_f = \mathbb{R}$$

الف) $y = \frac{(x-1)(x-5)}{(x-3)}$

$$\begin{array}{c} 2 \quad 3 \quad 5 \\ - \phi + \phi - \phi + \end{array} \rightarrow D_f = \mathbb{R} - \{3\}$$

ب) $y = \frac{(x-1)(x-5)}{(x-3)^2}$

$$\begin{array}{c} 2 \quad 3 \quad 5 \\ + \phi - \phi - \phi + \end{array} \rightarrow D_f = \mathbb{R} - \{3\}$$

الف) $y = \frac{x^2 - 3x + 2}{x - 3}$
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$$\begin{array}{c} 3 \\ - \phi + \end{array} \rightarrow D_f = (3, +\infty)$$

ب) $y = \frac{x^2 - 3x + 2}{x^2 - 5x + 6} = \frac{(x-1)(x-2)}{(x-2)(x-3)}$

$$\begin{array}{c} 1 \quad 2 \quad 3 \\ + \phi + \phi - \phi + \end{array}$$

$$D_f = (3, +\infty) \cup (1, 2] \cup (-\infty, 1)$$

الف) $y = \frac{x^2 - x^2}{x^2 + x + 2} = \frac{0}{x^2 + x + 2} \rightarrow$
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$$\begin{array}{c} 0 \quad 1 \\ + \phi - \phi + \end{array}$$

$$\rightarrow D_f = [1, +\infty) \cup (-\infty, 0]$$

ب) $y = \frac{x^2 + 3x + 2}{x^2 + 2x + 3} \neq 0$
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