

الف) $y^3 = x^2 - 1$ $\begin{cases} y_1^3 = x_1^2 - 1 \\ y_2^3 = x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1 = y_2$ $y = \sqrt[3]{x^2 - 1}$ تابع است

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

$(y_1^2 - y_2^2) + (y_1 - y_2) = 0 \Rightarrow (y_1 - y_2)(y_1 + y_2 + 1) = 0$ $(y_1 - y_2) = 0$ $(y_1 + y_2 + 1) = 0$ $y_1 = y_2$ تابع است

الف) $y = x^2 - 1$

ب) $|y| = x^2 - 1 \Rightarrow |y| = x^2 - 1 \Rightarrow y = \pm(x^2 - 1)$ تابع نیست

ج) $y^3 + x^3 = x - 1 \Rightarrow y^3 = x - 1 - x^3 \Rightarrow y = \sqrt[3]{x - 1 - x^3}$ تابع است

د) $\sqrt[3]{y} + \sqrt[3]{x} = 2 \Rightarrow \sqrt[3]{y} = 2 - \sqrt[3]{x} \Rightarrow y = (2 - \sqrt[3]{x})^3$ تابع است

الف) $\tan \frac{\pi}{3} = \tan 60^\circ = \frac{54}{61}$ $\frac{\sqrt{3}}{1} = \sqrt{3}$

ب) $\cot \frac{\sqrt{3}\pi}{4} = \cot 21^\circ = \frac{61}{54} = \frac{1}{\frac{54}{61}} = \frac{1}{\frac{1}{\sqrt{3}}} = \sqrt{3}$

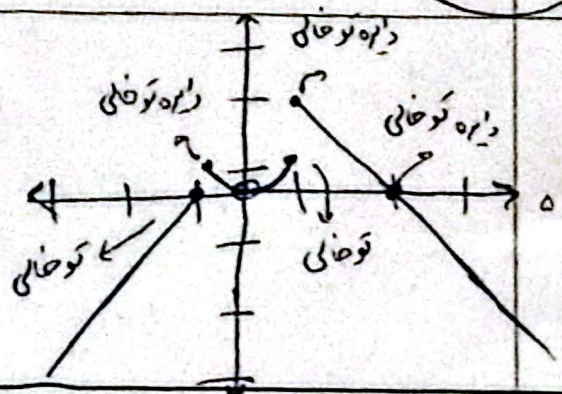
ج) $\tan 33^\circ = \frac{-1/\sqrt{3}}{1/\sqrt{3}} = -\frac{1}{\sqrt{3}}$

د) $\cot 18^\circ = \frac{1}{\tan 18^\circ} = \frac{1}{0} = \infty$ کیرفونوه

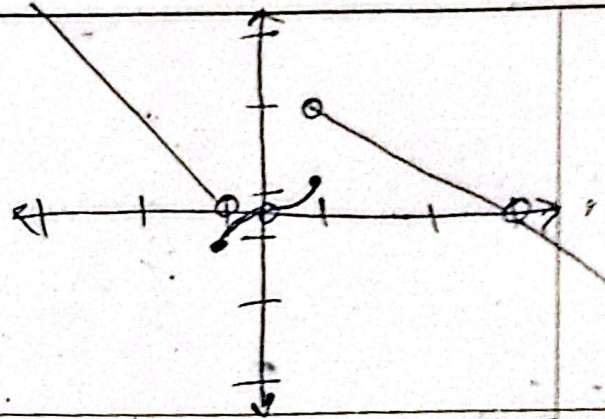
الف) $\sin \alpha = \frac{1}{2}$ $\alpha = 30^\circ, 150^\circ \Rightarrow \frac{\pi}{6}, \frac{5\pi}{6}$ $2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}$

ب) $\cos \alpha = \frac{\sqrt{2}}{2}$ $\alpha = 45^\circ, 315^\circ \Rightarrow \frac{\pi}{4}, \frac{7\pi}{4}$ $2k\pi + \frac{\pi}{4}, 2k\pi + \frac{7\pi}{4}$

$f(x) = \begin{cases} 2x+6 & x > 1 \\ x^2 & -1 < x < 1 \\ x+1 & x < -1 \end{cases}$



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



الف) $y = (x-2)(x-3)(x-4)$ $x=2, x=3, x=4$

2	3	4
-	+	-
+	-	+

ب) $y = (x-2)^2(x-3)^2(x-4)$ $x=2, x=3, x=4$

2	3	4
+	-	-
-	+	+

الف) $\frac{(x-2)(x-4)}{x-3}$

ب) $\frac{(x-2)(x-4)}{(x-3)^2}$

الف) $\frac{x^3 - 3x + 2}{x-2}$

ب) $\frac{(x+2)(x-1)^2}{x-2}$

الف) $\frac{x^3 - 3x + 2}{x-2} \rightarrow \frac{x^2 - 1}{x-2}$

ب) $\frac{(x+2)(x-1)^2}{x-2}$

الف) $\frac{x^2 - 3x + 2}{x^2 - 4x + 3} \rightarrow \frac{(x-1)(x-2)}{(x-1)(x-3)}$

ب) $\frac{x^2 - 3x + 2}{x^2 - 4x + 3}$

الف) $\frac{x^2 - x}{x^2 + x + 2}$

ب) $\frac{x^2 + 3x + 2}{x^2 + x + 3}$

الف) $\frac{x^2 - x}{x^2 + x + 2}$

ب) $\frac{x^2 + 3x + 2}{x^2 + x + 3}$