

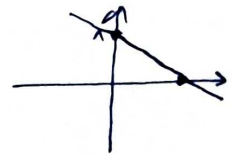
الف) $y_1^3 = 2x_1^2 - 1$ if $x_1 = x_2$ $y_1^3 = y_2^3 \rightarrow y_1 = y_2$ تابع است
 $y_2^3 = 2x_2^2 - 1$

ب) $y_1^3 + y_1 = 3x_1^2 - 1$ if $x_1 = x_2$ $y_1^3 + y_1 = y_2^3 + y_2 \rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$
 $y_2^3 + y_2 = 3x_2^2 - 1$
 $\rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0 \rightarrow \begin{cases} y_1 - y_2 = 0 \rightarrow y_1 = y_2 \\ y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow y_1 = \frac{-y_2 \pm \sqrt{y_2^2 - 4}}{2} \end{cases}$
 همیشه کوپل از منفرد است

الف) $y = x^2 - 1$
 تابع است 

ب) $|y_1 + x_1 y_1| = |x_1^2 + 1|$ if $x_1 = x_2$ $|y_1| = |y_2| \rightarrow y_1 = \pm y_2$ اگر $x=0$ $|y|=1 \rightarrow y = \pm 1$
 $|y_2 + x_2 y_2| = |x_2^2 + 1|$

ج) $y_1^3 + x_1^3 = 2x_1 + 1$ if $x_1 = x_2$ $y_1^3 = y_2^3 \rightarrow y_1 = y_2$
 $y_2^3 + x_2^3 = 2x_2 + 1$
 $\begin{cases} 1) \sqrt[3]{y} + \sqrt[3]{x} = 2 \\ \sqrt[3]{y} = 2 - \sqrt[3]{x} \\ \text{مربع می‌کنیم} \rightarrow y = -x + 1 \end{cases}$



الف) $\tan \frac{\pi}{3} = \frac{\frac{1}{\sqrt{3}}}{\frac{\sqrt{3}}{3}} = \frac{\sqrt{3}}{3}$

ب) $\cot \frac{\pi}{6} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$

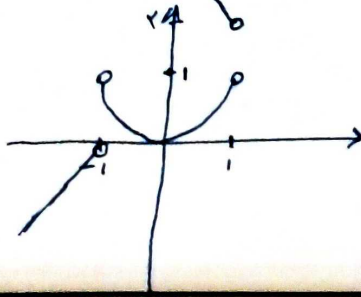
ج) $\tan 225^\circ = \frac{-\frac{1}{\sqrt{3}}}{\frac{\sqrt{3}}{3}} = -\frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

د) $\cot 180^\circ = \frac{-1}{0} \rightarrow$ تعریف نشده

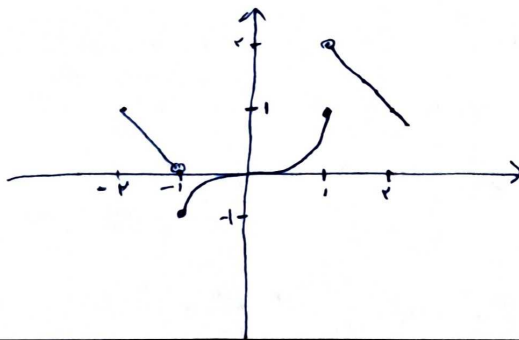
الف) $\sin \alpha = \frac{1}{2} \rightarrow \frac{\pi}{6}$ و $\frac{5\pi}{6}$ یا 30° و 150°

ب) $\cos \alpha = \frac{\sqrt{2}}{2} \rightarrow \frac{\pi}{4}$ و $\frac{3\pi}{4}$ یا 45° و 135°

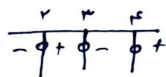
$f(x) = \begin{cases} -2x+4 & x > 1 \\ x^2 & -1 < x < 1 \\ x+1 & x < -1 \end{cases}$



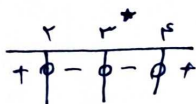
$$f(x) = \begin{cases} -x+2 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



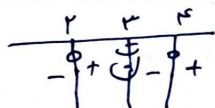
الف) $y = (x-2)(x-2)(x-2)$



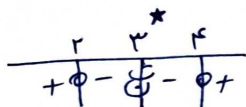
ب) $y = (x-2)(x-2)^2(x-2)$



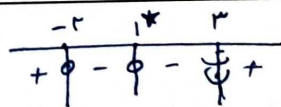
الف) $\frac{(x-2)(x-2)}{x-2}$



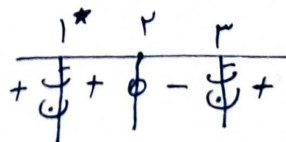
ب) $\frac{(x-2)(x-2)}{(x-2)^2}$



الف) $y = \frac{x^3-3x+2}{x-2} \xrightarrow{\div x-2} \frac{(x-1)(x+2)(x-1)}{x-2}$

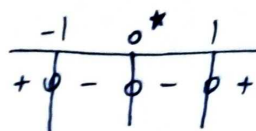


ب) $y = \frac{x^3-3x+2}{x^2-4x+4} = \frac{(x-2)(x-1)}{(x-2)(x-2)}$



الف) $y = \frac{x^2-x^2}{x^2+x+2} = \frac{x^2(x-1)(x+1)}{x^2+x+2}$

Δ جزو صفر کوچکتر
و منفی است پس ریشه درخرج نداریم



ب) $y = \frac{x^2+3x+2}{x^2+2x+2}$

Δ منفی است و ریشه نداریم

علامت صورت و مخرج
برای هر مقدار لا همیشه مثبت
و به ازای تمام اعداد حقیقی مثبت است