

الف) $y_1^3 = 2x_1^2 - 1$ $x_1 = x_2 \rightarrow y_1^3 = y_2^3$ $\xrightarrow{\text{فرد هم علامت}} y_1 = y_2$ تابع است.

ب) $y_1^3 + y_1 = 2x_1^2 - 1$ $x_1 = x_2 \rightarrow y_1^3 + y_1 = y_2^3 + y_2 \rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0$
 $y_2^3 + y_2 = 2x_2^2 - 1$
 $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$
 $\begin{cases} y_1 - y_2 = 0 & y_1 = y_2 \\ y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 & y_1 = \frac{-y_2 \pm \sqrt{y_2^2 - 4y_2^2 - 4}}{2} \end{cases}$

الف) $y = x^2 - 1$ تابع است خط موازی
 ج) $y_1^3 + x_1^2 = 2x_1 - 1$ $x_1 = x_2 \rightarrow y_1^3 = y_2^3$ $\xrightarrow{\text{فرد هم علامت}} y_1 = y_2$ تابع است.

ب) $|y| + xy = x^2 + 1$ $x=0 \rightarrow |y| = 1$ $y = \pm 1$ تابع نیست.
 ج) $\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2$ $x_1 = x_2 \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2}$ $\xrightarrow{\text{فرد هم علامت}} y_1 = y_2$ تابع است.

الف) $\tan \frac{\pi}{3} = \frac{\sin}{\cos} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3} \times 2}{2} = \sqrt{3}$

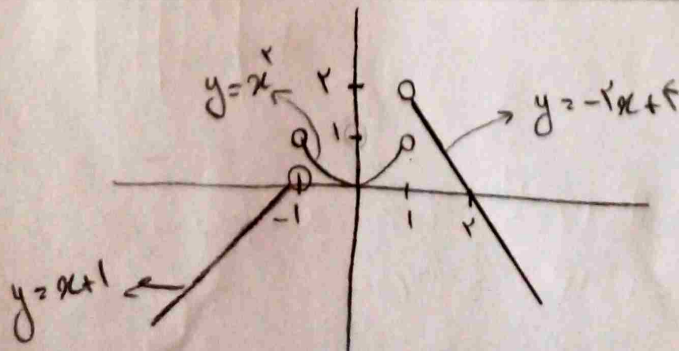
ب) $\cot \frac{7\pi}{6} = \frac{\cos}{\sin} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$

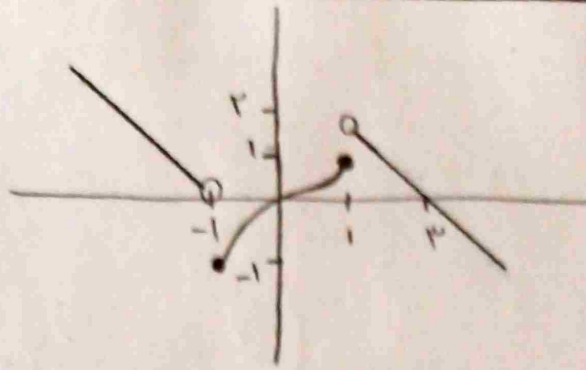
ج) $\cot 180^\circ = \frac{\cos}{\sin} = \frac{-1}{0}$ تعریف نشده

د) $\tan 330^\circ = \frac{\sin}{\cos} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$

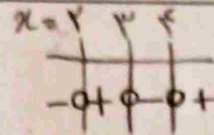
الف) $\sin a = \frac{1}{2}$ $30^\circ, 150^\circ$ $\frac{\pi}{6}, \frac{5\pi}{6}$

ب) $\cos a = \frac{\sqrt{2}}{2}$ $45^\circ, 315^\circ$ $\frac{\pi}{4}, \frac{7\pi}{4}$

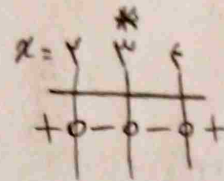




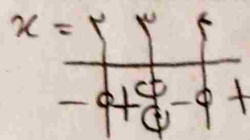
الف) $y = (x-2)(x-3)(x-4)$
 $2 \leftarrow \quad 3 \leftarrow \quad 4 \leftarrow$



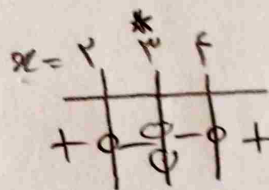
ب) $y = (x-2)(x-3)^2(x-4)$
 $2 \leftarrow \quad 3 \leftarrow \quad 4 \leftarrow$



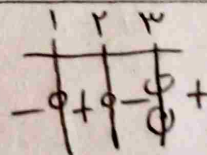
الف) $y = \frac{(x-2)(x-4)}{x-3}$
 $2 \leftarrow \quad 3 \leftarrow \quad 4 \leftarrow$



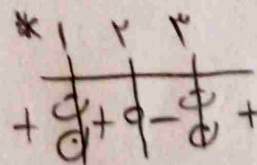
ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$
 $2 \leftarrow \quad 3 \leftarrow \quad 4 \leftarrow$



الف) $y = \frac{(x-1)(x-2)}{x-3}$
 $1 \leftarrow \quad 2 \leftarrow \quad 3 \leftarrow$



ب) $y = \frac{(x-1)(x-2)}{(x-1)(x-3)}$
 $1 \leftarrow \quad 2 \leftarrow \quad 3 \leftarrow$



الف) $y = \frac{x^2(x^2-1)}{x^2+x+2} = \frac{x^2(x-1)(x+1)}{x^2+x+2}$
 $0 \leftarrow \quad 1 \leftarrow \quad -1 \leftarrow$



$\Delta = 1^2 - 4 \times 2 \times 1 = -7$ ریشه ندارد

ب) $y = \frac{x^2+3x+4}{x^2+2x+2} \rightarrow \Delta = 9-16 \rightarrow$ منفی ریشه ندارد
 $\Delta = 4-12 \rightarrow$ منفی ریشه ندارد

همیشه مثبت

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