

الف) $y^3 = 2x^2 - 1 \rightarrow \begin{cases} y_1^3 = 2x_1^2 - 1 \\ y_p^3 = 2x_p^2 - 1 \end{cases} \xrightarrow{x_1 = x_p} y_1^3 = y_p^3 \Rightarrow y_1 = y_p$ تابع است

ب) $y^3 + y = 2x^2 - 1 \rightarrow \begin{cases} y_1^3 + y_1 = 2x_1^2 - 1 \\ y_p^3 + y_p = 2x_p^2 - 1 \end{cases} \xrightarrow{x_1 = x_p} y_1^3 + y_1 = y_p^3 + y_p \rightarrow y_1^3 - y_p^3 + y_1 - y_p = 0$
 $(y_1 - y_p)(y_1^2 + y_1 y_p + y_p^2 + 1) = 0 \Rightarrow \begin{cases} y_1 = y_p \checkmark \\ y_1^2 + y_1 y_p + y_p^2 + 1 = 0 \times \end{cases}$
 $y_1 = \frac{-y_p \pm \sqrt{\Delta}}{2}$ $\Delta = y_p^2 - 4(y_p^2 + 1)$
 $y_1 = \frac{-y_p \pm \sqrt{-3y_p^2 - 4}}{2}$

الف) $y = x^2 + 1 \rightarrow$  تابع است

د) $\sqrt[3]{y} + \sqrt[3]{x} = 2 \rightarrow \begin{cases} \sqrt[3]{y_1} + \sqrt[3]{x_1} = 2 \\ \sqrt[3]{y_p} + \sqrt[3]{x_p} = 2 \end{cases} \xrightarrow{x_1 = x_p} \sqrt[3]{y_1} + \sqrt[3]{x_p} = 2$
 $\sqrt[3]{y_1} = 2 - \sqrt[3]{x_p} \rightarrow y_1 = (2 - \sqrt[3]{x_p})^3$
 $\sqrt[3]{y_1} = \sqrt[3]{y_p} \rightarrow y_1 = y_p$ تابع است

ب) $|y| + xy = x^2 + 1 \xrightarrow{x=0} |y| = 1 \rightarrow y = \pm 1 \rightarrow$ تابع نیست

ج) $y^3 + x^3 = 2x - 1 \rightarrow \begin{cases} y_1^3 + x_1^3 = 2x_1 - 1 \\ y_p^3 + x_p^3 = 2x_p - 1 \end{cases} \xrightarrow{x_1 = x_p} y_1^3 = y_p^3 \rightarrow y_1 = y_p$ تابع است

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

ب) $\cot \frac{\sqrt{3}\pi}{4} = \frac{\cos \frac{\sqrt{3}\pi}{4}}{\sin \frac{\sqrt{3}\pi}{4}} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$

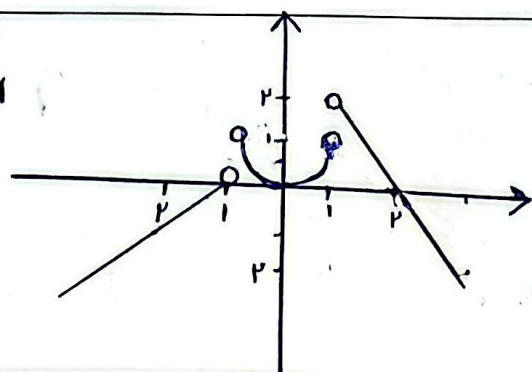
ج) $\tan 330^\circ = \frac{\sin 330^\circ}{\cos 330^\circ} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$

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

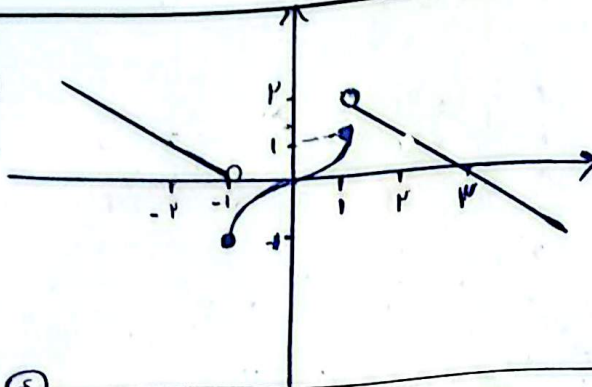
الف) $\sin \alpha = \frac{1}{p} \rightarrow \alpha = 30^\circ, 150^\circ$

ب) $\cos \alpha = \frac{\sqrt{3}}{p} \rightarrow \alpha = 30^\circ, 330^\circ$

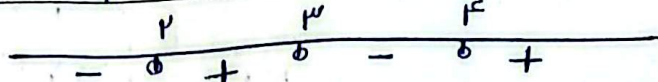
$f(x) = \begin{cases} -2x+1 & x > 1 \\ x^2 & -1 < x < 1 \\ -x-1 & x < -1 \end{cases}$



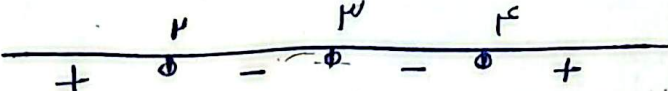
$$f(x) = \begin{cases} -x+3 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



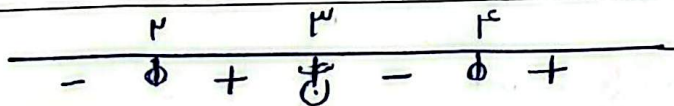
الف) $y = (x-2)(x-3)(x-4)$



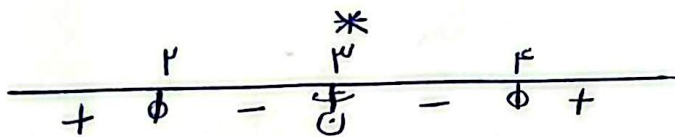
ب) $y = (x-2)(x-3)^2(x-4)$



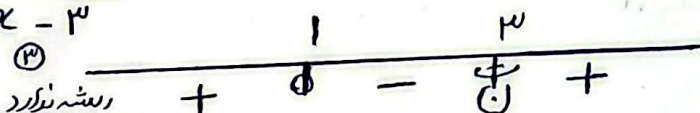
الف) $y = \frac{(x-2)(x-4)}{x-3}$



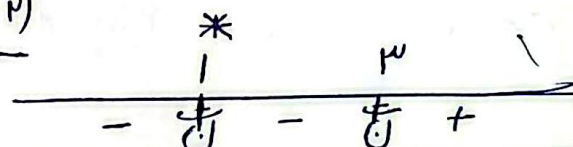
ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$



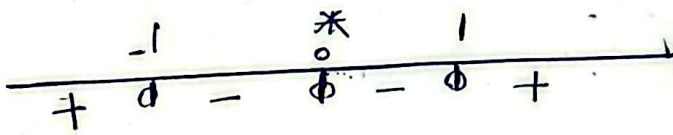
الف) $y = \frac{x^3 - 3x + 2}{x-3} = \frac{(x-1)(x^2 + x - 2)}{x-3}$



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



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



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

