

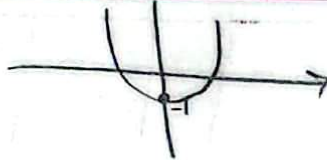
الف) $y_1^3 = 2x_1^2 - 1 \xrightarrow{x_1=x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2$
 $y_2^3 = 2x_2^2 - 1$

تابع هست

①

ب) $y_1^3 + y_1 = 3x_1^2 + 1 \xrightarrow{x_1=x_2} y_1^3 + y_1 = y_2^3 + y_2 \rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0$
 $y_2^3 + y_2 = 3x_2^2 + 1$
 $\Delta < 0 \leftarrow (y_1^2 + y_1 y_2 + y_2^2 + 1)$
 $\leftarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$
 $\leftarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$
 حد از صفر می‌رود

تابع هست



الف) $y = x^2 - 1$

تابع هست

②

ب) if $\rightarrow x=0 \rightarrow |y|=1 \rightarrow y=\pm 1$

تابع نیست

ج) $y^3 = -x^3 + 2x - 1 \rightarrow y = \sqrt[3]{-x^3 + 2x - 1}$

تابع هست

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

تابع هست

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

③

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

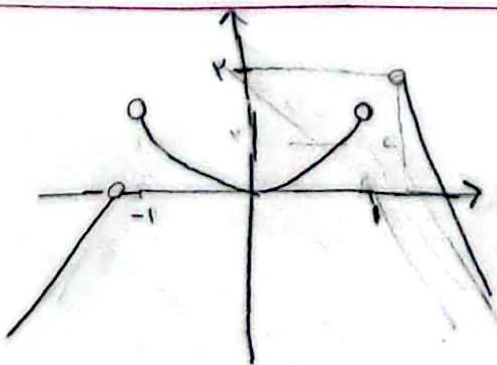
ج) $\tan 330^\circ \rightarrow \frac{\sin}{\cos} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} \sim -\frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

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

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

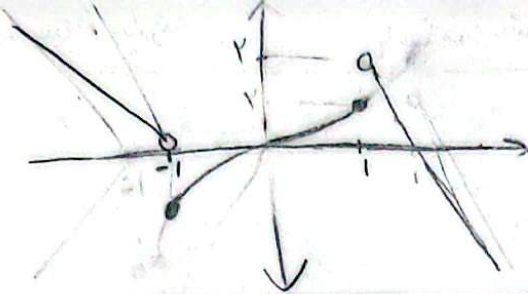
④

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



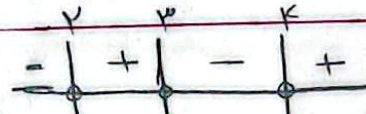
$f(x) = \begin{cases} -2x + 4 & x > 1 \\ x^2 & -1 < x < 1 \\ x + 1 & x < -1 \end{cases}$

⑤

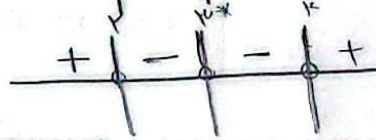


$$f(x) = \begin{cases} -x+2 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$

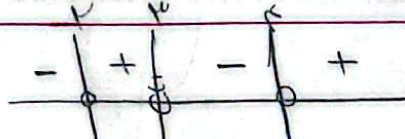
الف) $y = \underbrace{(x-2)}_2 \underbrace{(x-3)}_3 \underbrace{(x-5)}_5$



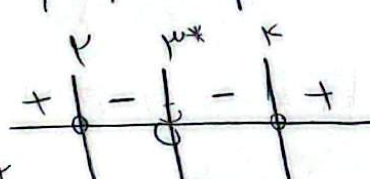
ب) $y = \underbrace{(x-2)}_2 \underbrace{(x-4)^2}_4 \underbrace{(x-5)}_5$



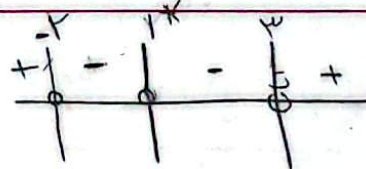
الف) $y = \frac{\underbrace{(x-2)}_2 \underbrace{(x-5)}_5}{\underbrace{x-3}_3}$



ب) $y = \frac{\underbrace{(x-2)}_2 \underbrace{(x-5)}_5}{\underbrace{(x-3)^2}_4}$

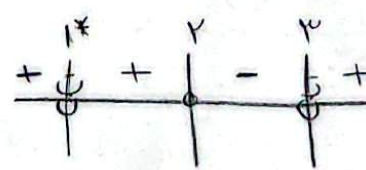


الف) $y = \frac{x^2 - 3x + 2}{x^2 - 5x + 3} \leq \frac{(x-1)(x-2)}{(x-1)(x-3)}$

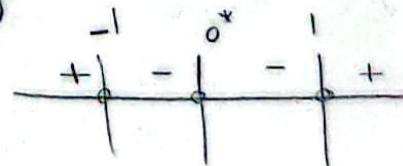


$$\begin{array}{r} x^2 - 3x + 2 \quad | \quad x-1 \\ -x^2 + x^2 \\ +x^2 - 3x + 2 \\ -x^2 + 3x - 2 \\ \hline -1x + 4 \\ +3x - 2 \\ \hline 2x + 2 \\ \hline x + 1 \end{array}$$

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



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



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

$\Delta < 0 \rightarrow \Delta < 0 \cup \Delta > 0 \leftarrow x \in \mathbb{R}$

$$\frac{-3 \pm \sqrt{9 - 12}}{2}$$

$$\frac{-2 \pm \sqrt{4 - 12}}{2}$$