

تابع است $y^3 = 2x^2 - 1$ (الف)

$$\begin{cases} y^3 = 2x_1^2 - 1 \\ y^3 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y^3 = y^3 \Rightarrow y_1 = y_2$$



تابع است $y^3 + y = 3x^2 - 1$ (ب)

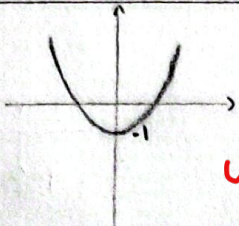
$$\begin{cases} y_1^3 + y_1 = 3x_1^2 - 1 \\ y_2^3 + y_2 = 3x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 + y_1 = y_2^3 + y_2 \Rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0$$

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

$$\Rightarrow y_1 - y_2 = 0 \Rightarrow y_1 = y_2$$

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تابع است $y = x^2 - 1$ (الف)



تابع نیست $|y| + xy = x^2 + 1$ (ب)

$$\rightarrow x = 0 \Rightarrow |y| = 1 \Rightarrow y = \pm 1$$



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تابع است $y^3 = -x^3 + 2x - 1$ (ج)

$$\begin{cases} y_1^3 = -x_1^3 + 2x_1 - 1 \\ y_2^3 = -x_2^3 + 2x_2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$$



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

$$\begin{cases} \sqrt[3]{y_1} = 2 - \sqrt[3]{x_1} \\ \sqrt[3]{y_2} = 2 - \sqrt[3]{x_2} \end{cases} \xrightarrow{x_1 = x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$$



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الف) $\tan\left(\frac{\pi}{3}\right) \rightarrow 40^\circ$

$$\rightarrow \frac{\sin}{\cos} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$



ب) $\cot\left(\frac{\sqrt{3}\pi}{4}\right) \rightarrow 110^\circ$

$$\rightarrow \frac{\cos}{\sin} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$$



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ج) $\tan 220^\circ$

$$\rightarrow \frac{\sin}{\cos} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$$



د) $\cot 110^\circ$

$$\rightarrow \frac{\cos}{\sin} = \left(\frac{-1}{0}\right) \rightarrow \text{تقریب نشده}$$



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الف) $\sin a = \frac{1}{2}$

$$\Rightarrow a = \frac{\pi}{6}, \frac{5\pi}{6}$$



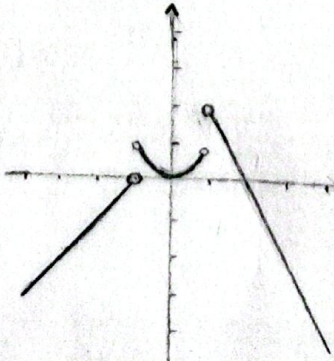
ب) $\cos a = \frac{\sqrt{2}}{2}$

$$\Rightarrow a = \frac{\pi}{4}, \frac{7\pi}{4}$$



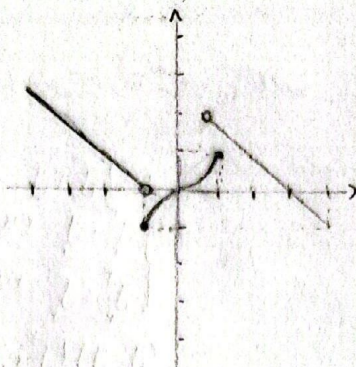
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$$f(x) = \begin{cases} -2x + 2 & x > 1 \\ x^2 & -1 < x < 1 \\ x + 1 & x < -1 \end{cases}$$

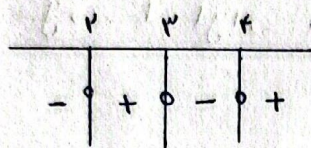


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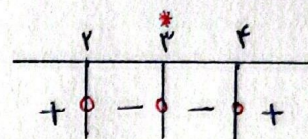
$$f(x) = \begin{cases} -x+3 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



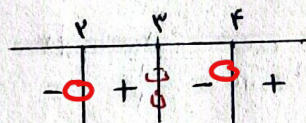
الف) $(x-2)(x-3)(x-4)$



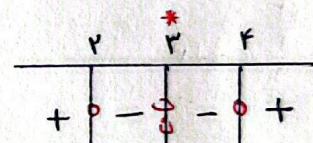
ب) $(x-2)(x-3)^2(x-4)$



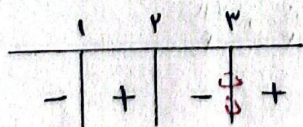
الف) $\frac{(x-2)(x-4)}{(x-3)}$



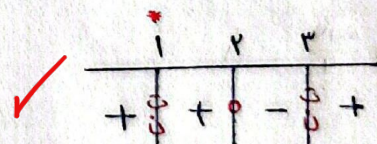
ب) $\frac{(x-2)(x-4)}{(x-3)^2}$



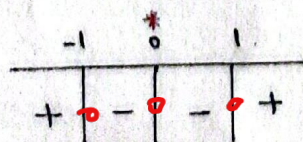
الف) $\frac{x^2-3x+2}{x-3} \rightarrow \frac{(x-2)(x-1)}{(x-3)}$



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



الف) $\frac{x^2-x^2}{x^2+x+2} \rightarrow \frac{x^2(x+1)(x-1)}{x^2+x+2}$
 $0 < x < 1$
 $(1-4(1)(1)) = (1-4)$



ب) $\frac{x^2+3x+2}{x^2+2x+3} \rightarrow \Delta < 0$
 $\frac{x^2+2x+3}{x^2+2x+3} \rightarrow \Delta < 0$

$\Delta(9-4(1)(1)) = (9-4)$

$\Delta(4-4(1)(1)) = (4-4)$

صورت و مخرج همواره مثبت و عبارت همواره مثبت است.