

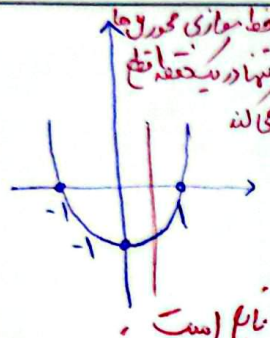
الف)
$$\left. \begin{aligned} y_1^3 + y_1 + 2x_1^2 - 1 \\ y_2^3 + y_2 + 2x_2^2 - 1 \end{aligned} \right\} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$$

ب)
$$\left. \begin{aligned} y_1^3 + y_1 + 2x_1^2 - 1 \\ y_2^3 + y_2 + 2x_2^2 - 1 \end{aligned} \right\} \xrightarrow{x_1 = x_2} y_1^3 + y_1 = y_2^3 + y_2$$

$$\rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$$

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

پس عبارت ده سه ریشه ندارد و هرگز برابر صفر نمی شود در نتیجه $y_1 = y_2$

الف) 

ب) $|y| = -xy + x^2 + 1$
 $x=0 \Rightarrow |y| = 0 + 0 + 1 \Rightarrow |y| = 1 \Rightarrow y = \pm 1$
 نایب نیست

ج)
$$\left. \begin{aligned} y_1^3 = -x_1^3 + 2x_1 - 1 \\ y_2^3 = -x_2^3 + 2x_2 - 1 \end{aligned} \right\} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$$

 نایب است

د)
$$\sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$$

 نایب است

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

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

ج) $\tan 120^\circ = \frac{\sin 120^\circ}{\cos 120^\circ} \Rightarrow \tan 120^\circ = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$

$\frac{-1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$

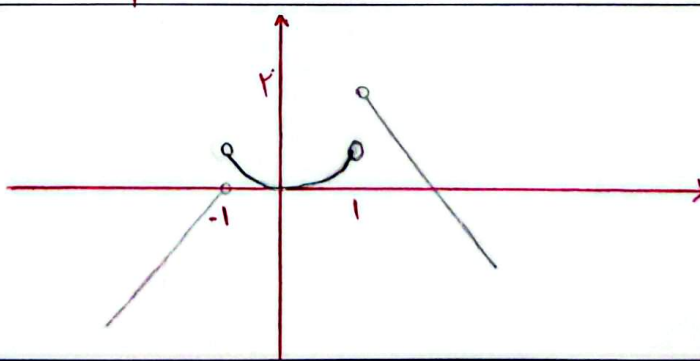
د) $\cot 18^\circ = \frac{\cos 18^\circ}{\sin 18^\circ} \Rightarrow \cot 18^\circ = \frac{1}{\tan 18^\circ}$

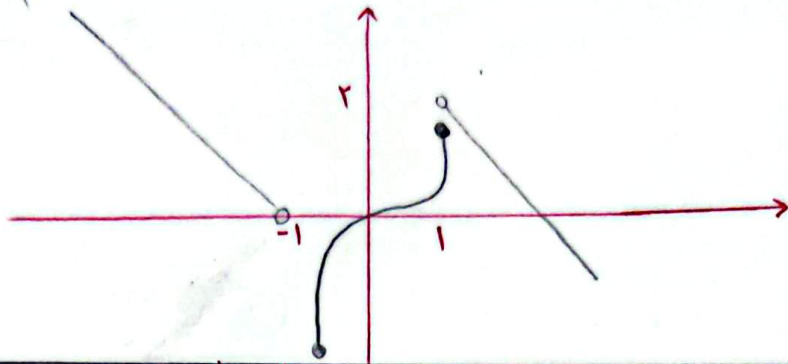
الف) $\sin \alpha = \frac{1}{2} \Rightarrow \arcsin \frac{1}{2} = 30^\circ, 150^\circ$

$$\Rightarrow \sin \alpha = \left\{ 2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right\}$$

ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \arccos \frac{\sqrt{2}}{2} = \frac{\pi}{4}, \frac{7\pi}{4}$

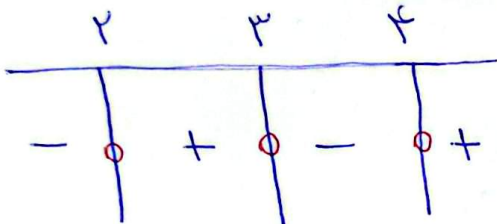
$$\Rightarrow \cos \alpha = \left\{ 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{7\pi}{4} \right\}$$



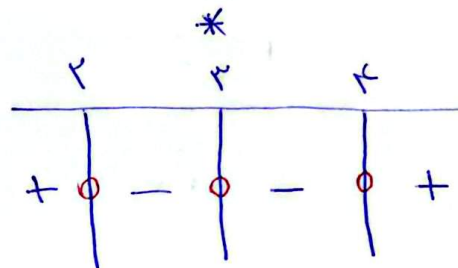


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(الف)

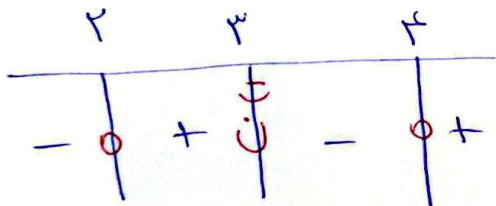


(ب)

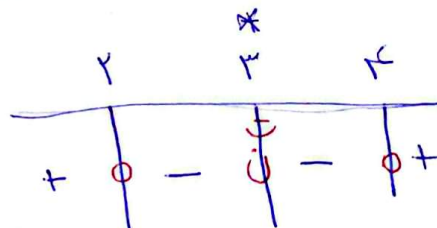


٧

(الف)



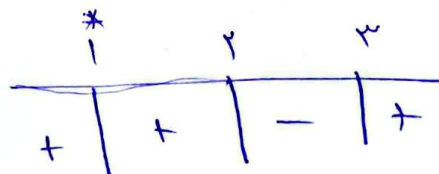
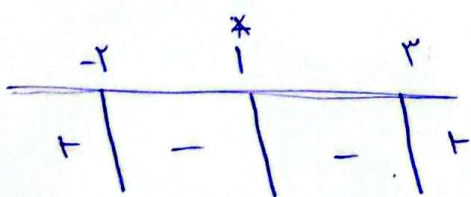
(ب)



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

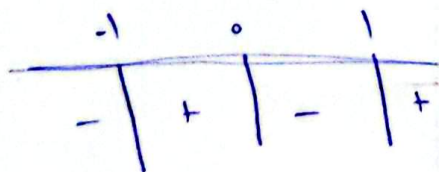
$\frac{x^2 - 2x + 2}{x^2 - 4x + 3} = \frac{(x-2)(x-1)}{(x-3)(x-1)}$



٩

(الف) $\frac{x^2 - x^2}{x^2 + x + 2} = \frac{x^2(x^2 - 1)}{x^2 + x + 2} = \frac{x^2(x+1)(x-1)}{x^2 + x + 2}$ ریشه ندارد $\Delta < 0$

(ب) $\frac{x^2 + 3x + 4}{x^2 + 2x + 3} \Rightarrow \Delta < 0$ صورت $\Delta < 0$ مخرج $\Delta < 0$



عبارت هواره مثبت و منفی $\Rightarrow$ ریشه ندارد

١٠