

الف) $y^3 = 2x^2 - 1$

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

$y_1 = y_2$ تابع است

ب) $y^3 + y = 3x^2 - 1$

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

$y_1^3 - y_2^3 + y_1 - y_2 = (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0$
 $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$ $\Rightarrow y_1 = y_2$ تابع است

الف) $y = x^2 - 1$

$y_1 = x_1^2 - 1$
 $y_2 = x_2^2 - 1$ $\xrightarrow{x_1 = x_2}$ $y_1 = y_2$ تابع است

ب) $|y| + xy = x^2 + 1$

$x=0 \Rightarrow |y|=1 \Rightarrow y=\pm 1$ تابع نیست

ج) $y^3 + x^3 = 2x - 1$

$y_1^3 + x_1^3 = 2x_1 - 1$
 $y_2^3 + x_2^3 = 2x_2 - 1$ $\xrightarrow{x_1 = x_2}$ $y_1^3 = y_2^3$
 $y_1 = y_2$ تابع است

د) $\sqrt[3]{y} + \sqrt{x} = 2$

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

الف) $\tan \frac{\pi}{4} \rightarrow \tan 45^\circ = \frac{\sin}{\cos} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2}$

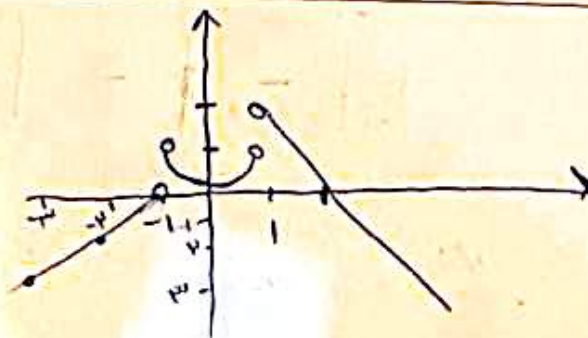
ب) $\cot 110^\circ \rightarrow \frac{\cos}{\sin} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$

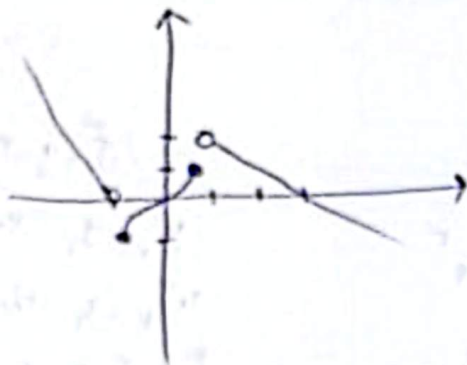
ج) $\tan 330^\circ \rightarrow \frac{\sin}{\cos} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$

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

الف) $\sin a = \frac{1}{4} \rightarrow \sin 150^\circ = \frac{1}{2} / \sin 30^\circ = \frac{1}{2} \rightarrow a = \frac{5\pi}{4}, \frac{\pi}{4}$

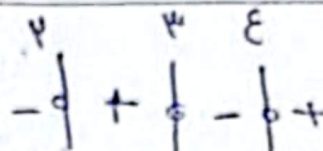
ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow \cos 45^\circ = \frac{\sqrt{2}}{2} / \cos 135^\circ = -\frac{\sqrt{2}}{2} \rightarrow a = \frac{\pi}{4}, \frac{7\pi}{4}$





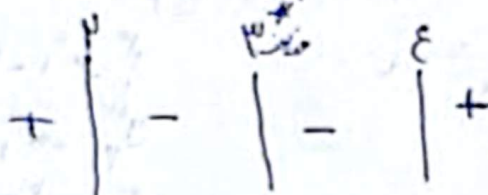
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الف) $٢ و ٣ و ٤ = ریشه ها$

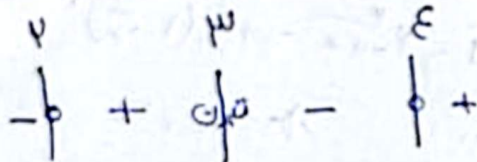


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ب)

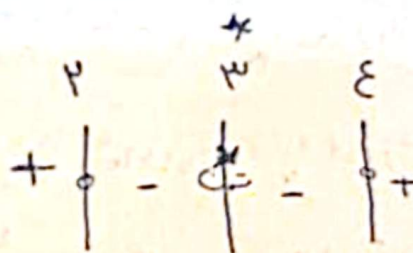


الف)



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ب)

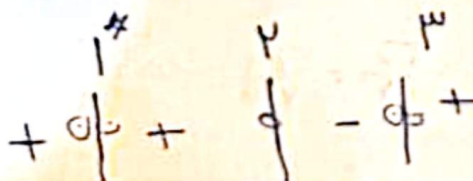


الف) $\frac{(x-1)^2(x+2)}{x-3}$

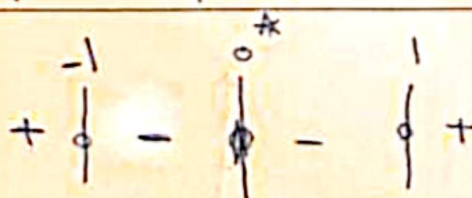


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ب) $\frac{(x-1)(x-2)}{(x-1)(x-3)}$



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



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ب)

$\Delta = 4-14 = -10$
 $\Delta = 12-9 = 3$

ریشه ندارد $\rightarrow x \in \mathbb{R}$ همه اعداد حقیقی