

الف) $y^3 = 2x^2 - 1$

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

$y_1 = y_2$ تابع است ✓

ب) $y^3 + y = 3x^2 - 1$

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

$$\begin{aligned} y_1^3 - y_2^3 + y_1 - y_2 &= (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0 \\ (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) &= 0 \end{aligned}$$

تابع است $y_1 = y_2$

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الف) $y = x^2 - 1$

$$\left. \begin{aligned} y_1 &= x_1^2 - 1 \\ y_2 &= x_2^2 - 1 \end{aligned} \right\} \begin{aligned} x_1 &= x_2 \\ y_1 &= y_2 \end{aligned}$$

تابع است

ب) $|y| + xy = x^2 + 1$

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

تابع نیست

ج) $y^3 + x^3 = 2x - 1$

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

تابع است $y_1 = y_2$

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د) $\sqrt[3]{y} + \sqrt{x} = 2$

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

تابع است

الف) $\tan \frac{\pi}{6} \rightarrow \tan 30^\circ = \frac{\sin}{\cos} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

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

تعریف نشده

ب) $\cot \frac{7\pi}{4} \rightarrow \cot 315^\circ = \frac{\cos}{\sin} = \frac{-\frac{\sqrt{2}}{2}}{-\frac{1}{2}} = \sqrt{2}$

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

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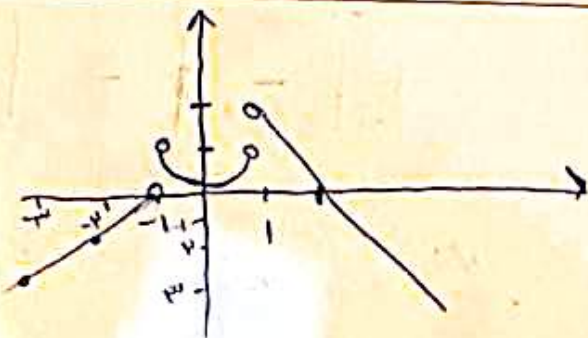
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الف) $\sin a = \frac{1}{4} \rightarrow \sin 150^\circ = \frac{1}{2} \mid \sin 30^\circ = \frac{1}{2} \rightarrow a = \frac{5\pi}{4}, \frac{\pi}{4}$

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

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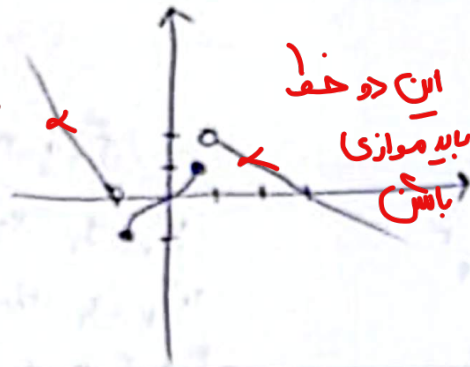
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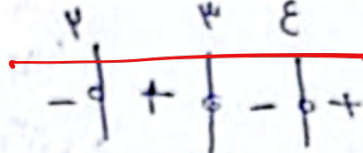
حیون سیب های
برابر دارند.



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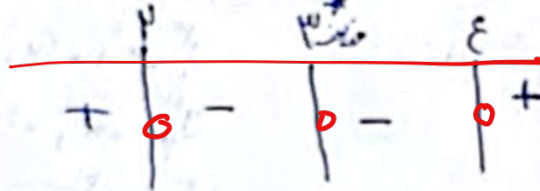
الف) ۴ و ۳ و ۲ = ریشه ها



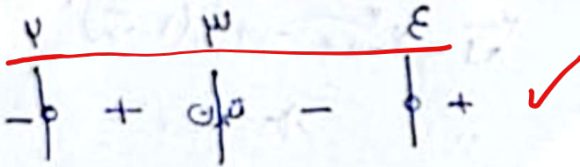
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ب)

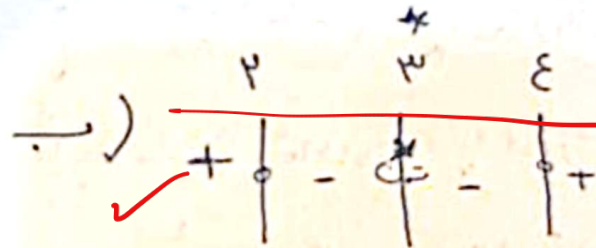


الف)

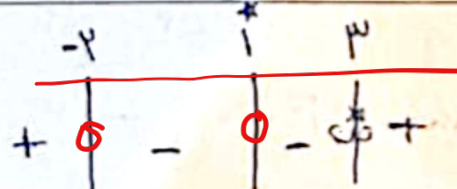


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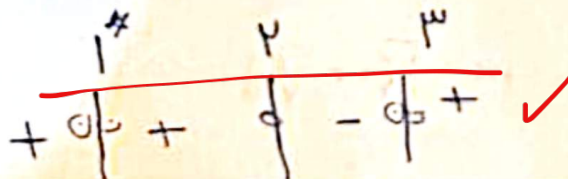
الف) $\frac{(x-1)^2(x+2)}{x-3}$



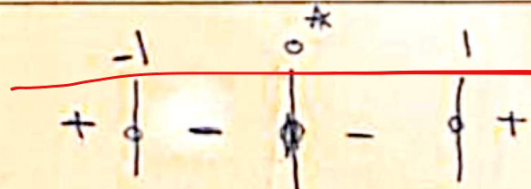
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ب) $\frac{(x-1)(x-2)}{(x-1)(x-3)}$



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



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۱۰

ب) $\Delta = 4-4 = 0$
 $\Delta = 12-9 = 3$

اینجا نداریم $x \in \mathbb{R}$

ما داریم تعیین
علامت می کنیم

$$y = \frac{x^2 + 3x + 4}{x^2 + 2x + 3}$$

$$\text{هواره مثبت} \Rightarrow (3)^2 - 4(1)(4) = -7 < 0$$

$$\text{هواره مثبت} \Rightarrow (2)^2 - 4(1)(3) = -8 < 0$$

عبارت هواره مثبت است