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الف) $y_1^3 = 2x_1^2 - 1$
 $y_2^3 = 2x_2^2 - 1$ } $x_1 = x_2 \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ✓

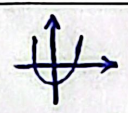
ب) $y_1^3 + y_1 = 2x_1^2 - 1$
 $y_2^3 + y_2 = 2x_2^2 - 1$ } $x_1 = x_2 \Rightarrow y_1^3 + y_1 = y_2^3 + y_2$ ✓

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

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

$y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \Rightarrow \Delta < 0$

هردو غیر حقیقی

الف) $y = x^2 - 1$ 

ب) $|y| + xy = x^2 + 1 \xrightarrow{x=y} |y| = 1 \Rightarrow y = \pm 1$ ✓

ج) $y_1^3 + x_1^3 = 2x_1 - 1$
 $y_2^3 + x_2^3 = 2x_2 - 1$ } $x_1 = x_2 \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ✓

د) $\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2$
 $\sqrt[3]{y_2} + \sqrt[3]{x_2} = 2$

$x_1 = x_2 \Rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$ ✓

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

ب) $\cot \frac{\pi}{6} = \frac{\cos \frac{\pi}{6}}{\sin \frac{\pi}{6}} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

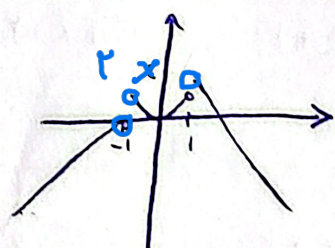
ج) $\tan \frac{3\pi}{4} = \frac{\sin \frac{3\pi}{4}}{\cos \frac{3\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$

د) $\cot \frac{\pi}{4} = \frac{\cos \frac{\pi}{4}}{\sin \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$ ✓

الف) $\sin \alpha = \frac{1}{2} \Rightarrow \alpha = \begin{cases} \frac{\pi}{6} \\ \frac{5\pi}{6} \end{cases}$

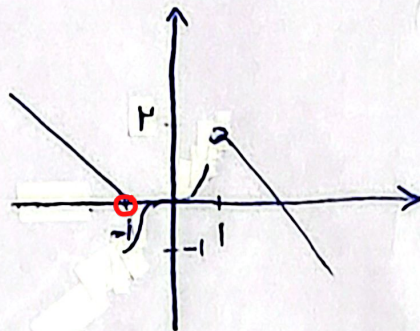
ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = \begin{cases} \frac{\pi}{4} \\ \frac{7\pi}{4} \end{cases}$ ✓

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



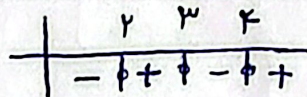
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$$f(x) = \begin{cases} -x+2 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$

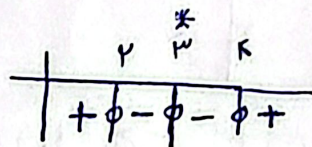


Ⓟ ✓

الف) $y = (x-2)(x-3)(x-5)$

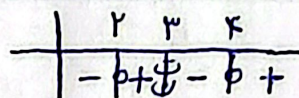


ب) $y = (x-2)(x-3)^2(x-5)$



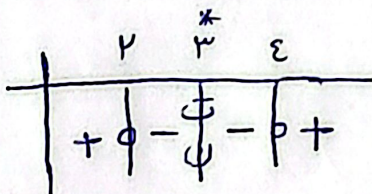
Ⓟ ✓

الف) $y = \frac{(x-2)(x-5)}{x-3}$



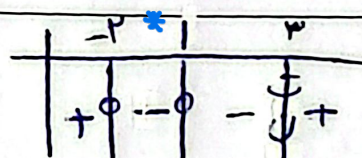
$$\begin{array}{r} x^3 - 2x^2 + 5x - 10 \\ -x^3 + x^2 \\ \hline x^2 - 7x + 10 \\ -x^2 + 5x \\ \hline -2x + 10 \\ +2x - 2 \\ \hline 8 \end{array}$$

ب) $y = \frac{(x-2)(x-5)}{(x-3)^2}$



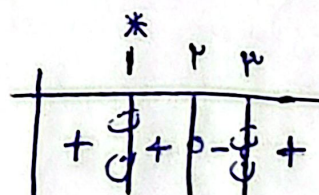
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الف) $y = \frac{x^3 - 3x^2 + 2}{x^2 - 5x + 3} = \frac{(x+2)(x-1)^2}{x-3}$



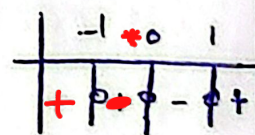
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ب) $y = \frac{x^3 - 3x^2 + 2}{x^2 - 5x + 3} = \frac{(x-1)(x+2)}{(x-3)(x-1)}$



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



حسب مثبت

$\Delta < 0$

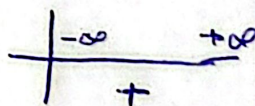
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$\Delta = 9 - 4(1)(2) = -7$

ریشه ندارد

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ب) $y = \frac{x^2 + 3x + 5}{x^2 + 2x + 3}$ این عبارت همواره مثبت



$\Delta = 4 - 4(1)(3) = -8$

ریشه ندارد