

تابع است $y^2 = 2x^2 - 1 \rightarrow \begin{cases} y_1^2 = 2x_1^2 - 1 \\ y_2^2 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2$

تابع نیست $y^2 + y = 3x^2 - 1 \rightarrow \begin{cases} y_1^2 + y_1 = 3x_1^2 - 1 \\ y_2^2 + y_2 = 3x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^2 + y_1 = y_2^2 + y_2 \rightarrow y_1^2 - y_2^2 + y_1 - y_2 = 0$

$(y_1 - y_2)(y_1 + y_2 + y_1 + y_2 + 1) = 0$

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

$y_1 - y_2 = 0 \rightarrow y_1 = y_2$ و $y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \xrightarrow{a=1, b=y^2, c=y^2+1} \Delta = b^2 - 4ac \rightarrow y^2 - 4(y^2 + 1) = -3y^2 - 4$

همیشه منفی و زیر ۰ $\Delta < 0$ تابع است

تابع است $y = x^2 - 1 \rightarrow \begin{cases} y_1 = x_1^2 - 1 \\ y_2 = x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1 = y_2$

تابع نیست $|y| + xy = x^2 + 1 \xrightarrow{x=0} |y| = 1 \rightarrow y = \pm 1$

تابع است $y^2 + x^2 = 2x - 1 \rightarrow \begin{cases} y_1^2 + x_1^2 = 2x_1 - 1 \\ y_2^2 + x_2^2 = 2x_2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2$

تابع است $\sqrt[3]{y} + \sqrt[3]{x} = 2 \rightarrow \begin{cases} \sqrt[3]{y_1} + \sqrt[3]{x_1} = 2 \\ \sqrt[3]{y_2} + \sqrt[3]{x_2} = 2 \end{cases} \xrightarrow{x_1 = x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2$

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

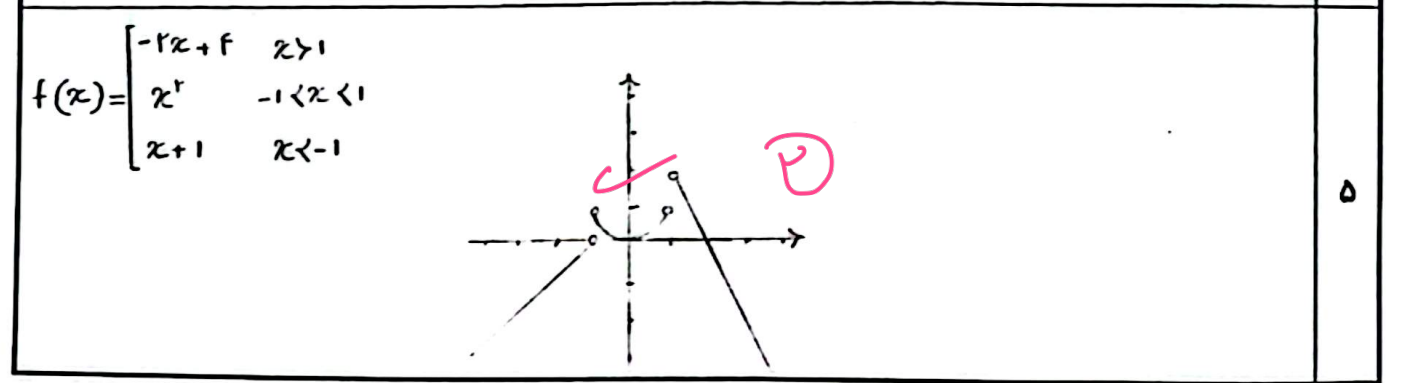
ب) $\cot \frac{\sqrt{2}}{6} = \frac{-\frac{\sqrt{2}}{2}}{-\frac{1}{2}} = \sqrt{2}$

ج) $\tan 30^\circ = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{-1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

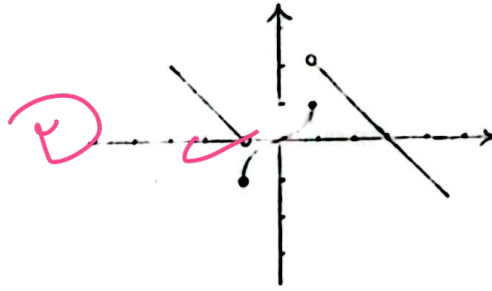
د) $\cot 180^\circ = \frac{0}{-1} = 0$ تعریف نشده

الف) $\sin a = \frac{1}{4} \rightarrow a = 30^\circ, 150^\circ \rightarrow a = \frac{\pi}{6}, \frac{5\pi}{6}$

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

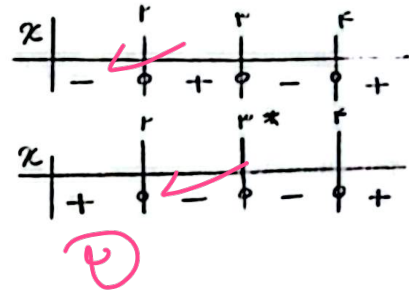


$$f(x) = \begin{cases} -x+1 & x > 1 \\ x^3 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



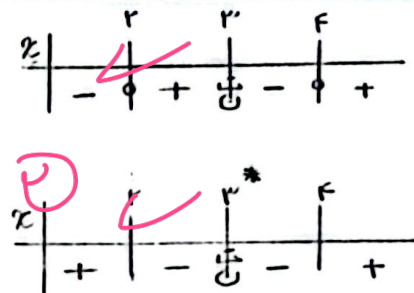
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الف) $y = (x-2)(x-3)(x-4)$ ریشه ها: 2, 3, 4



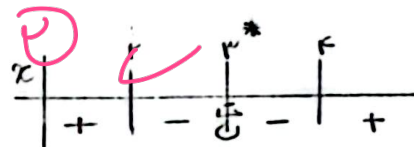
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ب) $y = (x-2)(x-3)^2(x-4)$ ریشه ها: 2, 3, 4



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الف) $y = \frac{(x-2)(x-4)}{x-3}$

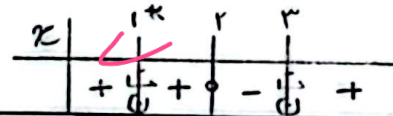


ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$

الف) $y = \frac{x^4 - 3x^2 + 2}{x-3} \rightarrow x^4 - 3x^2 + 2 = 0 \rightarrow x^2 - 1 = 0 \rightarrow x = \pm 1$

ب) $y = \frac{(x-1)^2(x+2)}{x-3} \rightarrow$ ریشه ها: 1, 3, -2

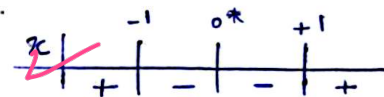
ج) $\frac{x^4 - 3x^2 + 2}{x^2 - 4x + 3} = \frac{(x-1)(x-1)}{(x-3)(x-1)}$ ریشه ها: 1, 3



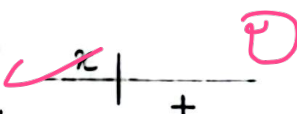
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الف) $y = \frac{x^2 - x^2}{x^2 + x + 2} = \frac{x^2(x^2 - 1)}{x^2 + x + 2} \rightarrow$ ریشه ها: 0, ±1

$\Delta = b^2 - 4ac = 1 - 8 = -7 \rightarrow$ ریشه ها: 0, ±1



ب) $y = \frac{x^2 + 3x + 4}{x^2 + 2x + 3} \rightarrow \Delta = 9 - 12 = -3 \rightarrow$ ریشه ها: 0, ±1



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