

الف) $y^3 = 2x^2 - 1 \rightarrow y_1^3 = 2x^2 - 1 \rightarrow y_1 = y_2 \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2$ تابع است.

ب) $y^3 + y = 3x^2 - 1 \rightarrow y_1^3 + y_1 = 3x^2 - 1 \rightarrow y_1^3 + y_1 = y_2^3 + y_2 \rightarrow -y_1^3 - y_1 + y_2^3 + y_2 = 0$
 $(y_2^3 + y_2 + y_1^3 + y_1 + 1)(y_2 - y_1) = 0 \rightarrow y_2 = y_1$ تابع است.

الف) $y = x^2 - 1 \rightarrow x=0 \rightarrow y=-1$ یا $x=1 \rightarrow y=0$ تابع است، به ازای هر مقدار x یک مقدار منحصر به فرد y دارد.

ب) $|y| + xy = x^2 + 1 \rightarrow x=0 \rightarrow |y| = 1 \rightarrow y = \pm 1$ تابع نیست.

ج) $y^3 + x^3 = 2x - 1 \rightarrow y^3 = -x^3 + 2x - 1 \rightarrow \sqrt[3]{y^3} = \sqrt[3]{-x^3 + 2x - 1}$ چون هر چه رادیکال فراتر است به ازای هر عدد حقیقی x یک مقدار y به دست می آید، تابع است.

د) $\sqrt[3]{y} + \sqrt[3]{x} = 2 \rightarrow \sqrt[3]{y} = -\sqrt[3]{x} + 2 \rightarrow y = -8\sqrt[3]{x} - x + 8$ به ازای هر مقدار x مقدار y منحصر به فرد است. تابع است.

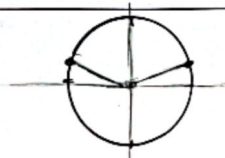
الف) $\tan \frac{\pi}{3} = \frac{\sin \frac{\pi}{3}}{\cos \frac{\pi}{3}} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

د) $\cot 18^\circ = \frac{\cos 18^\circ}{\sin 18^\circ} = \frac{-1}{0}$ تعریف نشده

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

ج) $\tan 33^\circ = \frac{\sin 33^\circ}{\cos 33^\circ} = \frac{-\frac{1}{\sqrt{3}}}{\frac{1}{\sqrt{3}}} = -\frac{1}{\sqrt{3}}$

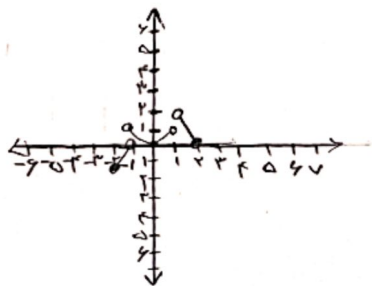
الف) $\sin a = \frac{1}{4} \quad a = \frac{\pi}{6} \text{ و } \frac{5\pi}{6}$



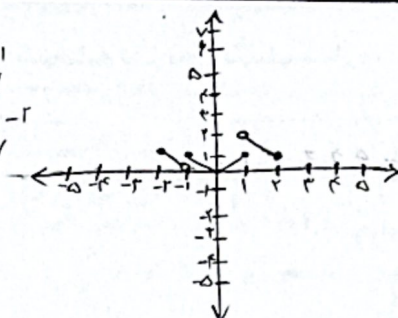
ب) $\cos a = \frac{\sqrt{2}}{4} \quad a = \frac{\pi}{4}, \frac{7\pi}{4}$



$f(x) = \begin{cases} -2x+2 & x > 1 \rightarrow \begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix} \\ x^2 & -1 < x < 1 \rightarrow \begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} \\ x+1 & x < -1 \rightarrow \begin{vmatrix} 1 & 1 \\ 0 & -1 \end{vmatrix} \end{cases}$

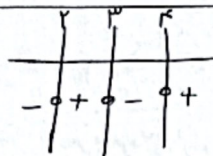


$$f(x) = \begin{cases} -x+1 & x > 1 \rightarrow \begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} \\ x^3 & -1 \leq x \leq 1 \rightarrow \begin{vmatrix} -1 & 1 \\ -1 & 1 \end{vmatrix} \\ -x-1 & x < -1 \rightarrow \begin{vmatrix} -1 & -1 \\ -1 & -1 \end{vmatrix} \end{cases}$$

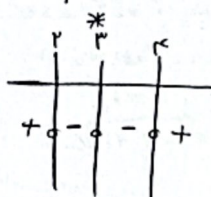


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الف) $y = (x-2)(x-3)(x-4)$

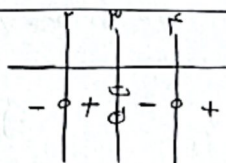


ب) $y = (x-2)(x-3)^2(x-4)$

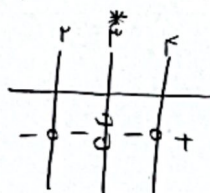


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الف) $y = \frac{(x-2)(x-4)}{x-3} \neq 0 \rightarrow x \neq 3$



ب) $\frac{(x-2)(x-4)}{(x-3)^2}$



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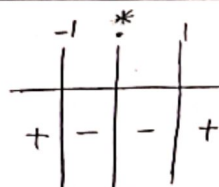
الف) $y = \frac{x^3 - 3x^2 + 2}{x-3}$

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



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



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ب) $y = \frac{x^2 + 3x + 4}{x^2 + 2x + 3} \rightarrow \Delta < 0$

