

الف) $y^3 = 2u^2 - 1$

$y_1^3 = 2u_1^2 - 1$

$y_2^3 = 2u_2^2 - 1 \xrightarrow{u_2 = u_1} y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \Rightarrow$ تابع است

ب) $y^3 + y = 2u^2 - 1 \Rightarrow y_1^3 + y_1 = 2u_1^2 - 1 \xrightarrow{u_1 = u_2} y_1^3 + y_1 = y_2^3 + y_2$

$\Rightarrow y_1^3 - y_2^3 = y_2 - y_1$

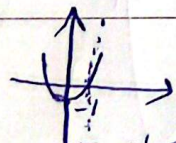
$(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) - y_2 + y_1 = 0$

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

$0 = 6^2 - 4ae \rightarrow y_2^2 - 4(y_2^2 + 1) = 0 \Rightarrow 1 + y_1^2 + y_2^2 + y_1 y_2 = 0$

$0 = y_2^2 - 4y_2^2 - 4 = -3y_2^2 - 4 < 0$ ② $\Rightarrow$ عبارت تابع است از ① و ②

الف) $y = u^2 - 1$



$\Rightarrow$ چون خط مماسی و در این نقطه مقدار از سطح صاف تابع است

ب) $u + y = u^2 + 1$

مبدأ با استفاده از مثال نقض اگر $u=0$ باشد و در این حالت u را حاصل می شود $y = \pm 1$ $\Rightarrow$ تابع نیست

ج) $y^3 + u^2 = 2u - 1$

$y_1^3 = 2u_1 - 1 - u_1^2 \xrightarrow{u_1 = u_2} y_2^3 = 2u_2 - 1 - u_2^2$

$y_2^3 = 2u_2 - 1 - u_2^2$

$\sqrt[3]{y_1} + \sqrt[3]{u} = 2$

$\sqrt[3]{y_1} = -\sqrt[3]{u} + 2 \xrightarrow{u_1 = u_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2 \Rightarrow$ تابع است

$\sqrt[3]{y_2} = -\sqrt[3]{u} + 2$

الف) $\tan \frac{\pi}{4} \rightarrow \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2}$ ✓

$\tan \frac{\pi}{4} = \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2}$

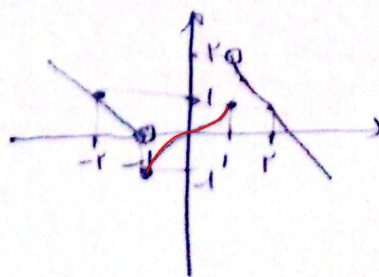
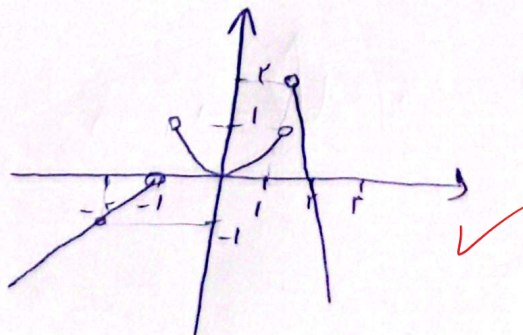
ب) $\cot \frac{\sqrt{2}\pi}{4} \rightarrow \frac{\cos \frac{\sqrt{2}\pi}{4}}{\sin \frac{\sqrt{2}\pi}{4}} = \frac{\cos 21.0}{\sin 21.0} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2}$ ✓

ج) $\tan \frac{\pi}{2} = \frac{\sin \frac{\pi}{2}}{\cos \frac{\pi}{2}} = \frac{1}{0} = \infty$ ✓

د) $\cot 11.0 = \frac{\cos 11.0}{\sin 11.0} = \frac{0.98}{0.19} = 5.16$ ✓

الف) $\sin a = \frac{1}{2} \rightarrow a = \frac{\pi}{6} \text{ و } a = \frac{5\pi}{6}$ ✓

ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow a = \frac{\pi}{4} \text{ و } \frac{3\pi}{4} = a$ ✓



الف) $y = (u-2)(u-3)(u-4)$

$(-\infty, 2) \cup (3, 4) < 0$ ✓
 $[2, 3] \cup [4, +\infty) \geq 0$ (1, 1, 1, 1)

ب) $y = (u-2)(u-3)^2(u-4)$

$(-\infty, 2] \cup [4, +\infty) \cup \{3\} \geq 0$
 $(2, 4) < 0$ برای 3 منفرجه

الف) $y = \frac{(u-2)(u-4)}{u-3}$

$(-\infty, 2) \cup (3, 4) < 0$
 $[4, +\infty) \cup [2, 3] \geq 0$ (2)

ب) $y = \frac{(u-2)(u-4)}{(u-3)^2}$

$(2, 4) - \{3\} < 0$
 $[4, +\infty) \cup (-\infty, 2] \geq 0$ (1)

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

$(-\infty, -2] \cup (3, +\infty) \geq 0$
 $(-2, 3) < 0$ برای 1 اوجیل منفرجه (1, 1, 1, 1)

برہان ۱

$\begin{array}{c|ccc} x & 1 & t & r \\ \hline y & +\phi+ & 0 & -\phi+ \end{array}$

$\Delta C_0 = 1 - 1 = -1$

$\begin{array}{c|cccc} u & -1 & 0 & 1 & \\ \hline y & + & - & - & + \end{array}$

$$\hookrightarrow \Delta = \epsilon - f_X r = -1 < 0$$

معادله درجه دوم

A simple hand-drawn smiley face consisting of two dots for eyes and a curved line for a mouth.