

الف) $\begin{cases} y_1^3 = 2x_1^2 - 1 \\ y_2^3 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1=x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ارفاق

ب) $\begin{cases} y_1^3 + y_1 = 2x_1^2 - 1 \\ y_2^3 + y_2 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1=x_2} y_1^3 + y_1 = y_2^3 + y_2$
 $y_1^3 + y_1 = y_2^3 + y_2 \Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2) = 0$
 تابع $y_1 + y_2 = 0$ $\Rightarrow y_1 = -y_2$ $\Rightarrow y_1^3 + y_1 = -y_2^3 - y_2 = -(y_2^3 + y_2)$ $\Rightarrow y_1^3 + y_1 = y_2^3 + y_2$ $\Rightarrow y_1 = y_2$ $\Rightarrow y_1 = y_2 = 0$ $\Rightarrow x_1 = x_2 = 0$

الف) $y = x^2 - 1$ $\checkmark$

ب) $|y| + xy = x^2 + 1 \rightarrow x=0 \Rightarrow |y|=1 \Rightarrow y = \pm 1$ $\checkmark$

ج) $\begin{cases} y_1^3 + x_1^2 = 2x_1 - 1 \\ y_2^3 + x_2^2 = 2x_2 - 1 \end{cases} \xrightarrow{x_1=x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \checkmark$

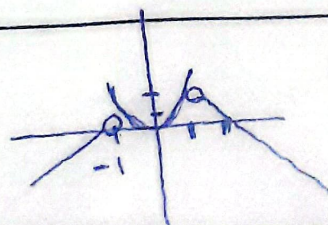
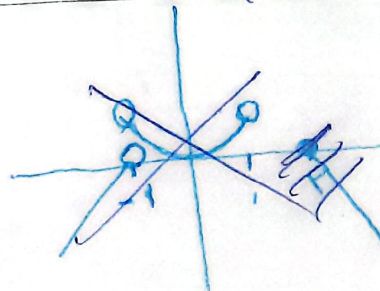
د) $\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2 \xrightarrow{x_1=x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2 \checkmark$

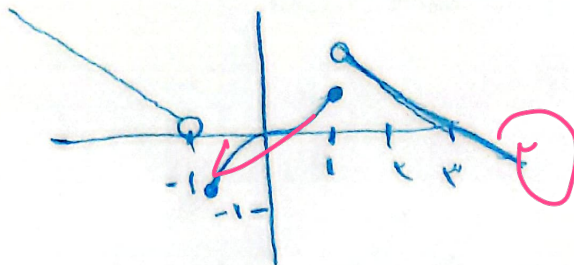
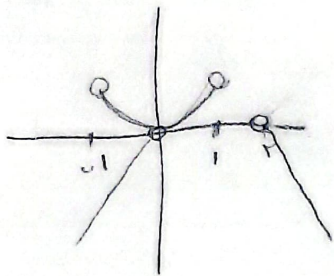
الف) $\frac{\pi}{3} \frac{\sin}{\cos} = \frac{\sqrt{3}}{2} \Rightarrow \frac{\sqrt{3}}{2} \cdot \frac{1}{\cos} = \frac{\sqrt{3}}{2} \Rightarrow \cos = 1 \Rightarrow \alpha = 0$

ب) $33 \cdot \frac{\sin}{\cos} = \frac{1}{\sqrt{3}} \Rightarrow \frac{1}{\sqrt{3}} \cdot \frac{1}{\cos} = \frac{1}{\sqrt{3}} \Rightarrow \cos = 1 \Rightarrow \alpha = 0$

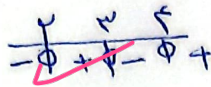
$0 \leq \alpha < 2\pi \rightarrow \sin \Rightarrow 30^\circ, 150^\circ \Rightarrow \frac{\pi}{6}, \frac{5\pi}{6}$
 $\cos \Rightarrow 45^\circ, 315^\circ \Rightarrow \frac{\pi}{4}, \frac{7\pi}{4}$

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

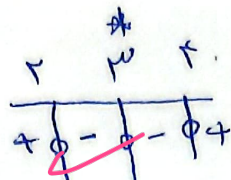




$y = (x-2)(x-3)(x-4)$
 الف



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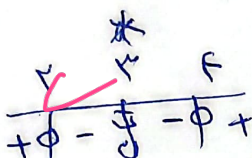


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$y_2 = \frac{(x-2)(x-4)}{x-3}$



$y_2 = \frac{(x-2)(x-4)}{(x-3)^2}$



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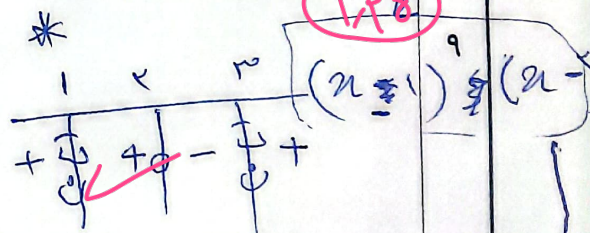
$y = \frac{x^2 - 3x + 2}{x^2 - 5x + 3}$

$x \leftarrow x-3$

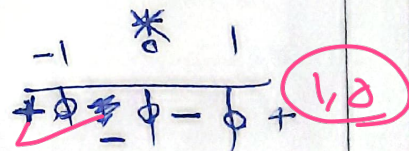
$x^2 - 3x + 2 = 0 \rightarrow x = 1, 2$

$x^2 - 5x + 3 = 0 \rightarrow x = \frac{5 \pm \sqrt{13}}{2}$

$y = \frac{x^2 - 3x + 2}{x^2 - 5x + 3}$

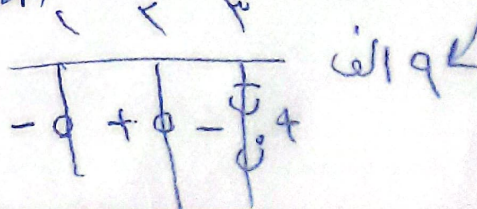


$y = \frac{x^2 - 3x + 2}{x^2 - 5x + 3}$



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$\Delta = 9 - 12 = -3$

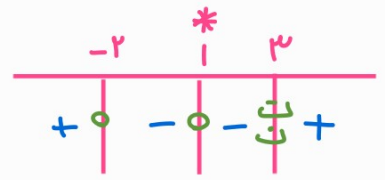


9- الف) $y = \frac{x^3 - x^2 + 2}{x - 3} = \frac{(n-1)(n^2 + n - 2)}{n - 3} = \frac{(n-1)(n+2)(n-1)}{n-3}$

جواب: صفرات ہیں بر $n-1$ منفی ہیرات!

Sign chart: $\begin{array}{c|ccc} & -2 & * & 3 \\ \hline & + & - & - \\ & \circ & \circ & \oplus \end{array}$

حجوف ذاب: صفات ہی بر ۱-۸ نفس پیرات!



(ب- ١٠) $y = \frac{n^2 + 3n + 2}{n^2 + 2n + 3} \rightarrow \Delta = (3)^2 - 4(2) = 9 - 14 < 0$
 $a = 1 > 0 \rightarrow$ معادله مسبّطه

$\Delta = (2)^2 - 4(3) = 4 - 12 = -8$
 $a = 1 > 0 \rightarrow$ معکوساً مثبت

عبارت همواره مثبت است!

ب- 1) $\int y_1^3 + y_1 = y_1^2 - 1 \xrightarrow{y_1 = nr} y_1^3 + y_1 = y_2^3 + y_2 \rightarrow \underbrace{y_1^3 - y_2^3}_{\text{فیل دقتبان}} + (y_1 - y_2) = 0$

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

$\downarrow$
 $y_1 = y_2$ (بجوابت!)

$\downarrow$
 $y_1 = \frac{-y_2 \pm \sqrt{y_2^2 - 4(y_2^2 + 1)}}{2}$