

$$y^3 = 2x^2 - 1 \quad \left\{ \begin{array}{l} y_1^3 = 2x_1^2 - 1 \\ y_2^3 = 2x_2^2 - 1 \end{array} \right\} \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \quad \text{عبارت تابع است}$$

$$y^3 + y = 2x^2 - 1 \quad \left\{ \begin{array}{l} y_1^3 + y_1 = 2x_1^2 - 1 \\ y_2^3 + y_2 = 2x_2^2 - 1 \end{array} \right\} \Rightarrow y_1^3 + y_1 = y_2^3 + y_2 \quad \text{ب}$$

$$\rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0 = (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) \quad \text{ب}$$

$$\Rightarrow \left\{ \begin{array}{l} y_1 - y_2 = 0 \Rightarrow y_1 = y_2 \\ y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \Rightarrow \Delta = b^2 - 4ac = y_1^2 - 4y_1 y_2 - 4 = -3y_1^2 - 4 \end{array} \right. \quad \text{که چنانچه از سر اول است پس عبارت تابع است}$$

$$y = x^2 - 1 \Rightarrow x_1 = x_2 \Rightarrow \left\{ \begin{array}{l} y_1 = x_1^2 - 1 \\ y_2 = x_2^2 - 1 \end{array} \right\} \Rightarrow y_1 = y_2 \quad \text{تابع است} \quad \text{۲- الف}$$

$$|y| + xy = x + 1 \Rightarrow |y| = 1 \Rightarrow y = \pm 1 \quad \text{پس تابع نیست} \quad \text{۲- ب}$$

$$y^3 + x^3 = 2x - 1 \Rightarrow y^3 = 2x - 1 - x^3 \Rightarrow \left\{ \begin{array}{l} y_1^3 = 2x_1 - 1 - x_1^3 \\ y_2^3 = 2x_2 - 1 - x_2^3 \end{array} \right\} \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \quad \text{تابع است} \quad \text{۳- ج}$$

$$\sqrt{y} + \sqrt{x} = 2 \Rightarrow \left\{ \begin{array}{l} \sqrt{y_1} + \sqrt{x_1} = 2 \\ \sqrt{y_2} + \sqrt{x_2} = 2 \end{array} \right\} \Rightarrow \sqrt{y_1} + \sqrt{x_1} = \sqrt{y_2} + \sqrt{x_2} \Rightarrow y_1 = y_2 \quad \text{تابع است} \quad \text{۳- د}$$

$$\tan \frac{\pi}{3} = \frac{\sin \frac{\pi}{3}}{\cos \frac{\pi}{3}} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3} \quad \text{۴- الف}$$

$$\cot \frac{\pi}{4} = \frac{\cos \frac{\pi}{4}}{\sin \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1 \quad \text{ب}$$

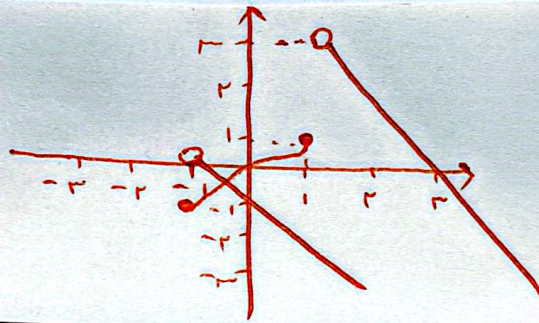
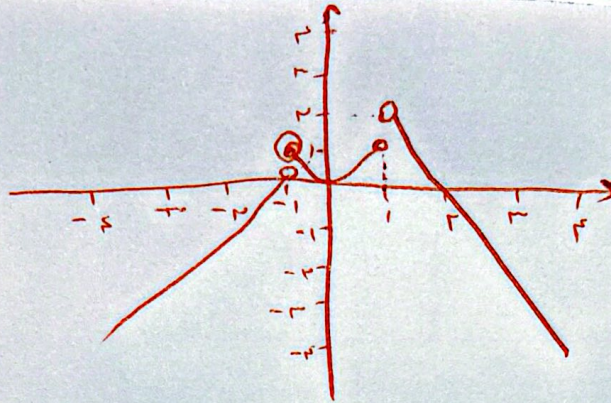
$$\tan \frac{\pi}{4} = \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1 \quad \text{ج}$$

$$\cot \frac{\pi}{2} = \frac{\cos \frac{\pi}{2}}{\sin \frac{\pi}{2}} = \frac{0}{1} = 0 \quad \text{د}$$

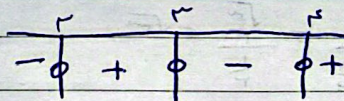
Subject:

الف) $\sin \alpha = \frac{1}{r} \Rightarrow \alpha = \left\{ \frac{\pi}{6}, \frac{5\pi}{6} \right\}$

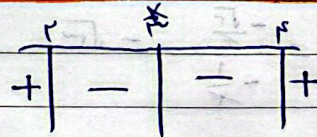
ب) $\cos \alpha = \frac{\sqrt{2}}{r} \Rightarrow \alpha = \left\{ \frac{\pi}{4}, \frac{7\pi}{4} \right\}$



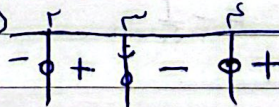
الف) $y = (x-2)(x-3)(x-4) = 0$



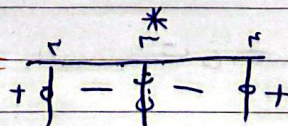
ب) $y = (x-2)(x-3)^2(x-4)$



الف) $y = \frac{(x-2)(x^2-5)}{x-3}$



ب) $y = \frac{(x-2)(x-3)}{(x-3)^2}$



IDEA

Subject:

$$\text{a) } y = \frac{x^2 - 7x + 12}{x - 3} = \frac{(x-1)(x^2 + x - 12)}{x - 3} = \frac{(x-1)(x+4)(x-3)}{x-3} \quad -9$$

$$\begin{array}{c} -3 \\ + \circ - \circ - \circ + \end{array}$$

$$\text{b) } \frac{x^2 - 7x + 12}{x^2 - 7x + 12} = \frac{(x-1)(x-3)}{(x-1)(x-3)} \Rightarrow \begin{array}{c} -3 \\ + \circ + \circ - \circ + \end{array}$$

$$\text{c) } y = \frac{x^2 - 2x}{x^2 + x + 5} = \frac{x(x-2)}{(x+1)(x+5)} \quad 1$$

$$\begin{array}{c} -1 \\ + \circ - \circ - \circ + \end{array}$$

$$\Delta = b^2 - 4ac = 1 - 4 = -3 \Rightarrow \Delta < 0 \Rightarrow \text{no real roots}$$

$$\text{d) } \frac{x^2 + 7x + 12}{x^2 + 7x + 12} = \frac{(x+3)(x+4)}{(x+3)(x+4)} \Rightarrow \Delta = b^2 - 4ac = 49 - 48 = 1 \Rightarrow \text{real roots}$$

$$\Delta = b^2 - 4ac = 49 - 48 = 1 \Rightarrow \Delta > 0 \Rightarrow \text{real roots}$$

$$\begin{array}{c} \text{---} \\ \text{---} \\ | \end{array}$$