

1- الف) $y^r = 2x^r - 1$ $\Rightarrow \begin{cases} y_1^r = 2x_1^r - 1 \\ y_2^r = 2x_2^r - 1 \end{cases} \Rightarrow y_1^r = y_2^r \Rightarrow y_1 = y_2$ (تابع است)

ب) $y^r + y = 2x^r - 1$ $\Rightarrow \begin{cases} y_1^r + y_1 = 2x_1^r - 1 \\ y_2^r + y_2 = 2x_2^r - 1 \end{cases} \Rightarrow y_1^r + y_1 = y_2^r + y_2$

$\Rightarrow y_1^r - y_2^r + y_1 - y_2 = 0 = (y_1 - y_2)(y_1^r + y_1 y_2^r + y_2^r) + (y_1 - y_2) = (y_1 - y_2)(y_1^r + y_1 y_2^r + y_2^r + 1)$
 $\Rightarrow \begin{cases} y_1 - y_2 = 0 \Rightarrow y_1 = y_2 \\ y_1^r + y_1 y_2^r + y_2^r + 1 = 0 \Rightarrow \Delta = b^2 - 4ac = y_1^r - 4y_1 y_2^r - 4 = -3y_1^r - 4 \end{cases}$
 پس عبارت تابع است

2- الف) $y = x^r - 1 \Rightarrow x_1 = x_2 \Rightarrow \begin{cases} y_1 = x_1^r - 1 \\ y_2 = x_2^r - 1 \end{cases} \Rightarrow y_1 = y_2$ (تابع است)

ب) $|y| + xy = x + 1 \Rightarrow |y| = 1 \Rightarrow y = \pm 1$ پس تابع نیست

3- الف) $y^r + x^r = 2x - 1 \Rightarrow y^r = 2x - 1 - x^r \Rightarrow \begin{cases} y_1^r = 2x_1 - 1 - x_1^r \\ y_2^r = 2x_2 - 1 - x_2^r \end{cases} \Rightarrow y_1^r = y_2^r \Rightarrow y_1 = y_2$ (تابع است)

ب) $\sqrt{y} + \sqrt{x} = 2 \Rightarrow \begin{cases} \sqrt{y_1} + \sqrt{x_1} = 2 \\ \sqrt{y_2} + \sqrt{x_2} = 2 \end{cases} \Rightarrow \sqrt{y_1} + \sqrt{x_1} = \sqrt{y_2} + \sqrt{x_2} \Rightarrow y_1 = y_2$ (تابع است)

3- الف) $\tan \frac{x}{r} = \frac{\sin \frac{x}{r}}{\cos \frac{x}{r}} = \frac{\frac{\sqrt{r}}{r}}{\frac{1}{r}} = \sqrt{r}$

ب) $\cot \frac{\sqrt{x}}{r} = \frac{\cos \frac{\sqrt{x}}{r}}{\sin \frac{\sqrt{x}}{r}} = \frac{-\frac{\sqrt{r}}{r}}{-\frac{1}{r}} = \sqrt{r}$

ج) $\tan \frac{\sqrt{r}}{r} = \frac{\sin \frac{\sqrt{r}}{r}}{\cos \frac{\sqrt{r}}{r}} = \frac{-\frac{1}{r}}{\frac{\sqrt{r}}{r}} = -\frac{1}{\sqrt{r}}$

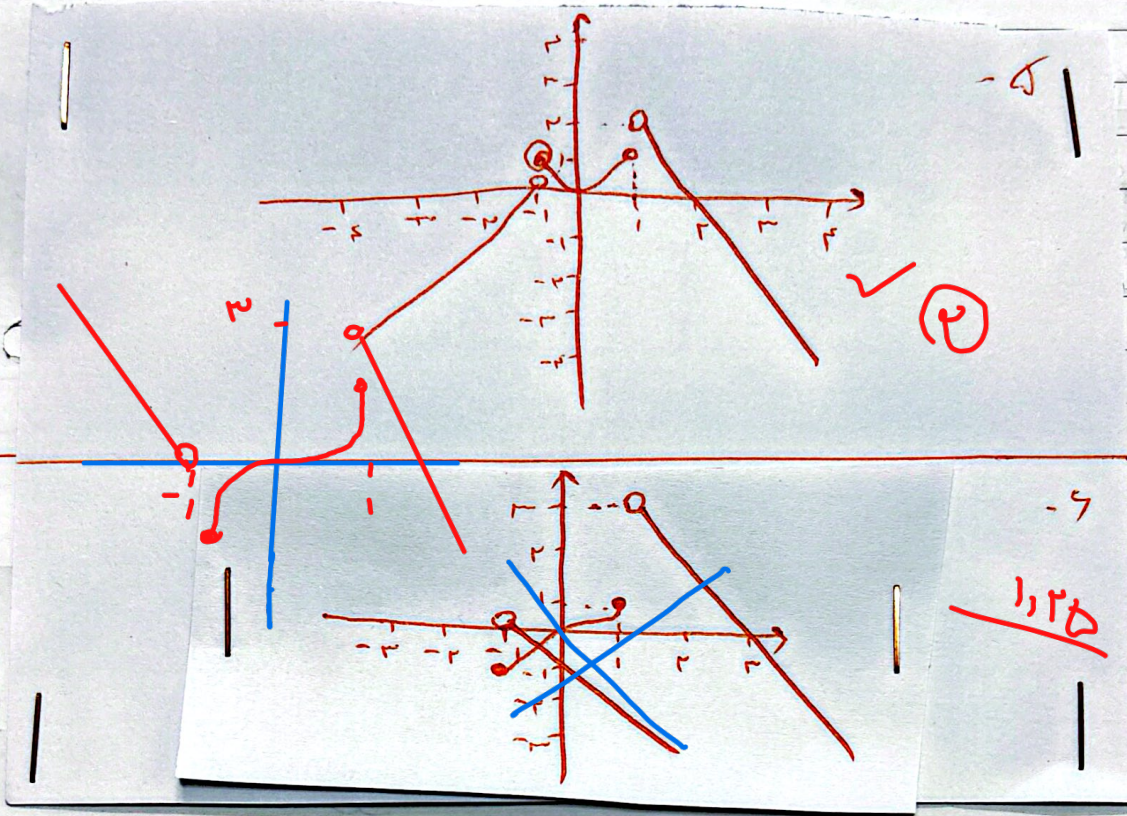
د) $\cot \frac{1}{r} = \frac{\cos \frac{1}{r}}{\sin \frac{1}{r}} = \frac{-1}{0} = \infty$

Subject:

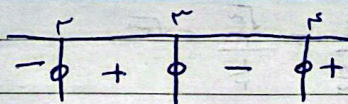
الف) $\sin \alpha = \frac{1}{r} \Rightarrow \alpha = \left\{ \frac{\pi}{6}, \frac{5\pi}{6} \right\}$

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

Ⓟ ✓

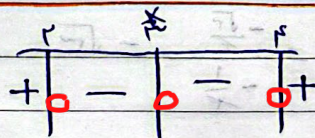


الف) $(x-2)(x-3)(x-4) = y$

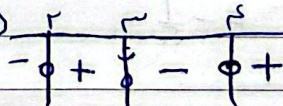


Ⓟ ✓

ب) $y = (x-2)(x-3)^2(x-4)$

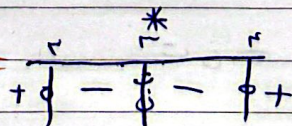


الف) $y = \frac{(x-2)(x^2-5)}{x-3}$



Ⓟ ✓

ب) $\frac{(x-2)(x-3)}{(x-3)^2}$



IDEA

Subject:

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

$$\textcircled{P} \checkmark \quad \begin{array}{c} -2 \\ + \circ - \circ - \circ + \end{array}$$

$$\omega 2) \frac{x^2 - 7x + 12}{x^2 - 8x + 15} = \frac{(x-1)(x-2)}{(x-1)(x-3)} \Rightarrow \begin{array}{c} -2 \\ + \circ + \circ - \circ + \end{array}$$

$$\omega 1) y = \frac{x^2 - 2x}{x^2 + x + 5} = \frac{x(x-1)(x+1)}{x^2 + x + 5} \quad \begin{array}{c} -1 \\ + \circ - \circ - \circ + \end{array} \quad 1.$$

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

$$\omega 2) \frac{x^2 + 7x + 12}{x^2 + 7x + 12} = 1 \Rightarrow \Delta = b^2 - 4ac = 49 - 48 = 1 \Rightarrow \text{no real roots}$$

$$\Delta = b^2 - 4ac = 49 - 48 = 1 \Rightarrow \Delta < 0 \Rightarrow \text{no real roots}$$

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

$$\textcircled{P} \checkmark$$