

(الف) تابع است.

$$\left. \begin{array}{l} y_1^3 = 3x_1^2 - 1 \\ y_2^3 = 3x_2^2 - 1 \end{array} \right\} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2$$

(۱.۷۵)

(ب) تابع است

$$\left. \begin{array}{l} y_1^3 + y_1 = 3x_1^2 - 1 \\ y_2^3 + y_2 = 3x_2^2 - 1 \end{array} \right\} \xrightarrow{x_1 = x_2} y_1^3 + y_1 = y_2^3 + y_2 \rightarrow y_1^3 + y_1 - y_2^3 - y_2 = 0$$

همیشه صحت

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

$$y = x^2 - 1$$

(۲) (الف) تابع است.

(۲)

$$|y| + xy = x^2 + 1 \xrightarrow{x=0} |y| + 0 = 0 + 1 \rightarrow |y| = 1$$

$$y \rightarrow \pm 1$$

تابع نیست

(ج) تابع است

$$\left. \begin{array}{l} y_1^3 + x_1^3 = 2x_1 - 1 \\ y_2^3 + x_2^3 = 2x_2 - 1 \end{array} \right\} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2$$

$$\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2$$

$$\sqrt[3]{y_2} + \sqrt[3]{x_2} = 2$$

$$\rightarrow y_1 = y_2$$

تابع است

$$\tan \frac{\pi}{3} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3} \quad \checkmark$$

(٣) الف

(٢)

$$\cot \frac{\sqrt{\pi}}{9} = \frac{1 + \frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3} \quad \checkmark$$

(ب)

$$\tan 330^\circ = \tan \frac{11\pi}{6} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} \quad \checkmark$$

(ج)

$$\cot 180^\circ = \cot \pi = \frac{-1}{0} \rightarrow \text{تعريف ليس له} \quad \checkmark$$

(د)

$$\sin \alpha = \frac{1}{2} \rightarrow \alpha = \frac{\pi}{6}, \frac{5\pi}{6} \quad \checkmark$$

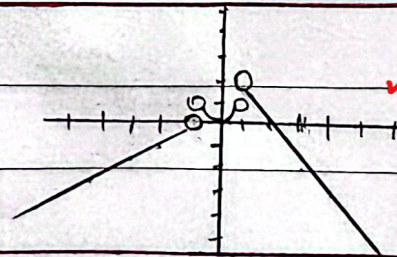
(٤) الف

(٢)

$$\cos \alpha = \frac{\sqrt{2}}{2} \rightarrow \alpha = \frac{\pi}{4}, \frac{7\pi}{4} \quad \checkmark$$

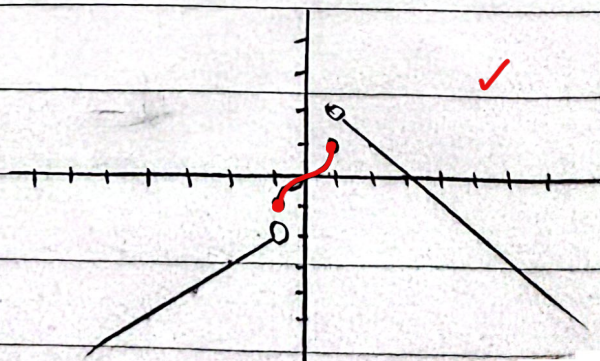
(ب)

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



(٥) (٢) ✓

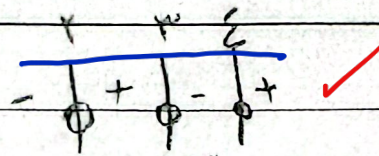
$$f(x) = \begin{cases} -x+2 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



(٦)

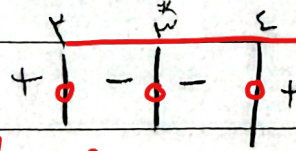
(٢) ✓

$$y = (x-2)(x-3)(x-4)$$



(الف) (17)
(17.1)

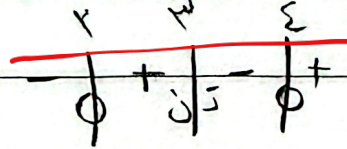
$$y = (x-2)(x-3)^2(x-4)$$



صفر توی جدول مشخص ندری

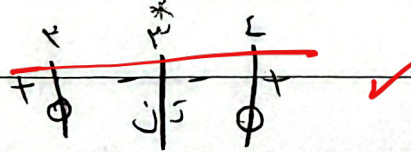
(ب) (18)

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



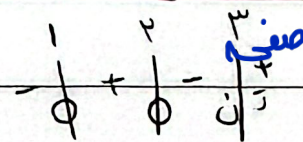
(الف) (19)
(2)

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



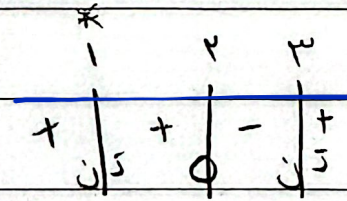
(ب)

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



(الف) (20)
(1) ~~پس صفر~~

$$y = \frac{x^2 - 3x + 2}{x^2 - 4x + 3} = \frac{(x-2)(x-1)}{(x-3)(x-1)}$$

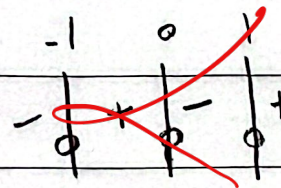


(ب)

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

$$1 - 1 = 0 \rightarrow$$

$$-1 = \Delta$$



(الف) (21)
(17.5)

$$y = \frac{x^2 + 3x + 4}{x^2 + 2x + 3} \rightarrow 9 - 14 = 5 \Rightarrow \Delta = 7 -$$

$$x^2 + 2x + 3 \rightarrow 4 - 12 = 8 \Rightarrow \Delta = 7 -$$

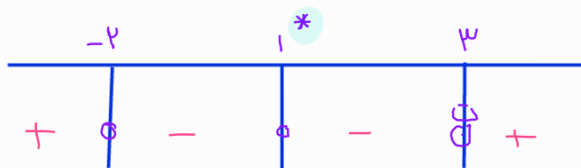
صورت و مخرج مثبت است به عبارت دیگر مثبت است

الف) $y = \frac{x^3 - 3x + 2}{x - 3}$

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

$\xrightarrow{-2}$ $\xrightarrow{3}$

ریشه ها $\Rightarrow -2$ و 3



الف) $y = \frac{x^4 - x^2}{x^2 + x + 2}$

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

$\xrightarrow{\pm 1}$ $\Delta < 0$

ریشه ها $\Rightarrow -1$ و 1

