

۱۹، ۱۵

الف: $y_1^3 + y_1 = 2x_1^2 - 1$ $\Rightarrow y_1^3 + y_1 + 1 = y_1^3 + y_1 + 1$
 $y_2^3 + y_2 = 2x_2^2 - 1$ $\Rightarrow y_2^3 + y_2 + 1 = y_2^3 + y_2 + 1$
 $\Rightarrow y_1 = y_2$
 تابع است

ب: $y_1^3 + y_1 = 2x_1^2 - 1$ $\Rightarrow y_1^3 + y_1 + 1 = y_1^3 + y_1 + 1$
 $y_2^3 + y_2 = 2x_2^2 - 1$ $\Rightarrow y_2^3 + y_2 + 1 = y_2^3 + y_2 + 1$
 $\Rightarrow y_1 = y_2$
 تابع است

الف: رسم شکل $y = x^2 - 1$
 تابع است

ب: $y = x^2 - 1$
 تابع نیست

الف: $\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2$ $\Rightarrow \sqrt[3]{y_1} - 2 = \sqrt[3]{x_1} - 2$
 $\sqrt[3]{y_2} + \sqrt[3]{x_2} = 2$ $\Rightarrow \sqrt[3]{y_2} - 2 = \sqrt[3]{x_2} - 2$
 $\Rightarrow y_1 = y_2$
 تابع است

ب: $\sqrt[3]{y_1} + \sqrt[3]{x_1} = 2$ $\Rightarrow \sqrt[3]{y_1} - 2 = \sqrt[3]{x_1} - 2$
 $\sqrt[3]{y_2} + \sqrt[3]{x_2} = 2$ $\Rightarrow \sqrt[3]{y_2} - 2 = \sqrt[3]{x_2} - 2$
 $\Rightarrow y_1 = y_2$
 تابع است

الف: $\cot \frac{\sqrt{3}}{5} = \cot 21.0^\circ = \frac{\cos 21.0^\circ}{\sin 21.0^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$
 تابع است

ب: $\tan \frac{\pi}{3} = \tan 60^\circ = \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$
 تابع است

الف: $\cot 18^\circ = \frac{\cos 18^\circ}{\sin 18^\circ} = \frac{1}{0}$ (تعریف نشده)
 تابع است

ب: $\tan 33^\circ = \frac{\sin 33^\circ}{\cos 33^\circ} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$
 تابع است

الف: $\cos \alpha = \frac{\sqrt{2}}{2}$
 $\Rightarrow \alpha = \left\{ 2k\pi \pm \frac{\pi}{4} \right\}$

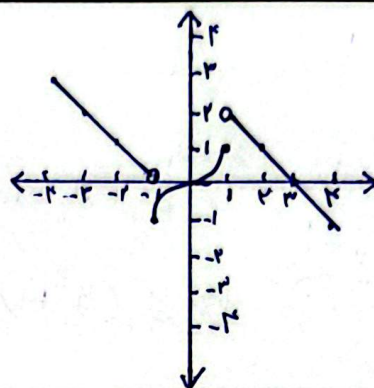
ب: $\sin \alpha = \frac{1}{2}$
 $\Rightarrow \alpha = \left\{ 2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right\}$

سوال در بازه $0 < \alpha < 2\pi$ خواسته

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

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

$$f(x) = \begin{cases} -x+3 & x > 1 \\ x^3 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$



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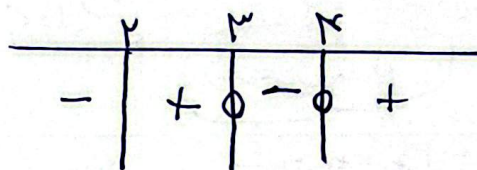
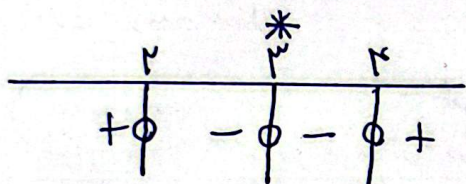
$$y = (x-1)(x-2)^2(x-3)$$

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$$y = (x-1)(x-2)(x-3)$$

الف

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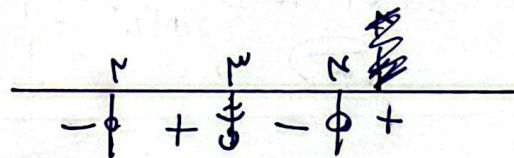
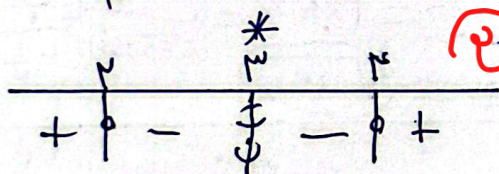
$$y = \frac{(x-1)(x-2)}{(x-3)^2}$$

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

الف

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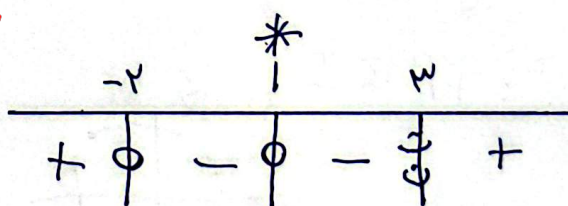
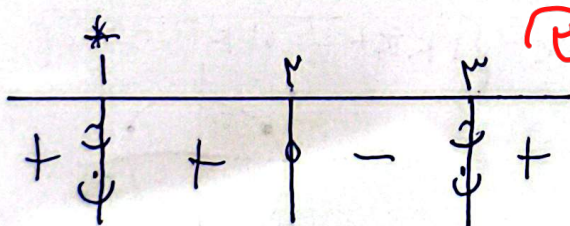


$$y = \frac{x^2-3x+2}{x^2-4x+3} = \frac{(x-1)(x-2)}{(x-1)(x-3)}$$

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

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$$y = \frac{x^2+3x+2}{x^2+2x+3} \rightarrow \Delta = 9 - (3 \times 2) = 9 - 6 = 3 > 0$$

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

الف

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$\Rightarrow$ (عبارت در مخرج مثبت است)

$$\Delta = 1 - (1 \times 2) = -1 < 0 \Rightarrow$$



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$$y_1^3 + y_1 = 3x_1^2 - 1$$

$$y_2^3 + y_2 = 3x_2^2 - 1 \xrightarrow{x_1 = x_2}$$

$$y_1^3 + y_1 = 3x_1^2 - 1$$

$$y_2^3 + y_2 = 3x_2^2 - 1$$

← ب

$$\rightarrow y_1^3 + y_1 = y_2^3 + y_2 \rightarrow$$

$$\rightarrow (y_1^3 - y_2^3) + (y_1 - y_2) = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0$$

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

$$y_1 = y_2 \quad \checkmark \rightarrow \text{تابع است}$$

$$y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow \Delta = (y_2)^2 - 4(y_2^2 + 1) = -3y_2^2 + 4 \rightarrow \Delta < 0$$

← ریشه ندارد