

الف) $y_1^3 = 2x_1^2 - 1$ $x_1 = x_2 \rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ✓ تابع است

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

ب) $y_1^3 + y_1 = 2x_1^2 - 1$ $x_1 = x_2 \rightarrow y_1^3 + y_1 = y_2^3 + y_2 \Rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2) = 0$

$y_1^3 + y_2^3 = 2x_2^2 - 1$

$\begin{cases} y_1 - y_2 = 0 \Rightarrow y_1 = y_2 \text{ ✓ تابع است} \\ y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2 \neq 0 \\ y_1 = \frac{-y_2 \pm \sqrt{\Delta}}{2} \rightarrow \Delta = y_2^2 - 4(y_2^2 + y_2 + 1) = -3y_2^2 - 4y_2 - 4 \\ \Rightarrow y_1 = \frac{-y_2 \pm \sqrt{-3y_2^2 - 4y_2 - 4}}{2} \rightarrow \Delta < 0 \end{cases}$

الف) رسم مثلث  ✓ تابع است

$\rightarrow) x \geq 0 \rightarrow |y| \geq 1 \Rightarrow y \geq \pm 1$

ب) $y_1^3 + x_1^3 = 2x_1 - 1$ $x_1 = x_2 \rightarrow y_1^3 + x_2^3 = 2x_2 - 1 \Rightarrow y_1 = x_2$ ✓ تابع است

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

ج) $\sqrt[3]{y_1 + x_1} = \sqrt[3]{2x_1 - 1}$ $x_1 = x_2 \rightarrow \sqrt[3]{y_1 + x_2} = \sqrt[3]{2x_2 - 1} \Rightarrow y_1 = x_2$ ✓ تابع است

$\sqrt[3]{y_2 + x_2} = \sqrt[3]{2x_2 - 1}$

الف) $\tan \frac{\pi}{4} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} \Rightarrow \sqrt{3}$

ب) $\cot \frac{\sqrt{\pi}}{4} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$

ج) $\tan 330 = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\sqrt{3}$

د) $\cot 180 = \frac{-1}{0} = \text{تعریف نشده}$
جواب ندارد

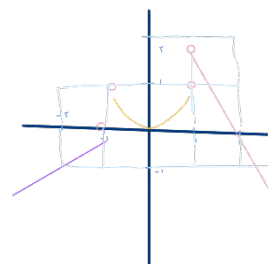
الف) $\sin a = \frac{1}{4} \rightarrow 30^\circ, 150^\circ \rightarrow \left\{ k\pi + \frac{\pi}{6}, k\pi - \frac{\pi}{6} \right\}$

ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow 45^\circ, 315^\circ \rightarrow \left\{ k\pi + \frac{\pi}{4}, k\pi - \frac{\pi}{4} \right\}$

$y_2 y_1 + 1 \xrightarrow{n=-1} y \geq 0 \Rightarrow (-1, 0)$

$y_2 x^2 \xrightarrow{n=1} (-1, 1)$

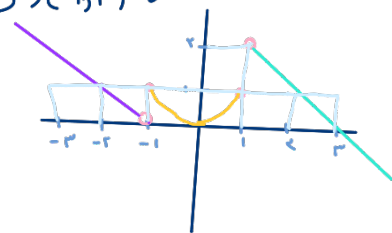
$y_2 - 2x + 4 \xrightarrow{n=1} y \geq 2 \Rightarrow (1, 2)$



$$y = -x - 1 \xrightarrow{x=0} y = -1 \quad (-1, 0) \times$$

$$y = 2^x \xrightarrow{x=0} y = 1 \rightarrow (0, 1) \times \quad (-1, 1), (1, 1) \checkmark$$

$$y = -x + 3 \xrightarrow{x=1} y = 2 \rightarrow (1, 2) \checkmark$$

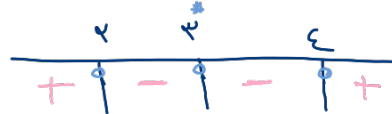


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الف) $(x-2)(x-3)(x-4) = 0 \Rightarrow x = \{2, 3, 4\}$



ب) $(x-2)(x-3)(x-3)(x-4) = 0 \Rightarrow x = \{2, 3^*, 4\}$



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الف) $y = \frac{(x-2)(x-4)}{x-3}$



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



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الف) $\frac{x^3 - 3x + 2}{x-3} = \frac{(x-1)(x-1)(x+2)}{x-3} = 0 \Rightarrow x = \{1, -2, 3\}$



ب) $\frac{(x-1)(x-2)}{(x-1)(x-3)}$



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الف) $\frac{x(x-1)(x+1)}{x^2 - 1}$



ب) همیشه جواب این معادله + صورت x غنیمت ندارد

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