

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

ب) $y^3 + y = 3x^2 - 1 \Rightarrow \begin{cases} y_1^3 + y_1 = 3x_1^2 - 1 \\ y_2^3 + y_2 = 3x_2^2 - 1 \end{cases} \xrightarrow{x_1=x_2} y_1^3 + y_1 = y_2^3 + y_2 \Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2 + 1) = 0$
 $\Rightarrow y_1 - y_2 = 0 \Rightarrow y_1 = y_2$ تابع است ✓

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

ب) $x=0 \Rightarrow |y| + 0 \times y = 0^2 + 1 \rightarrow |y| = 1 \Rightarrow y = 1$ یا $y = -1$ X تابع نیست

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

د) $\sqrt[3]{y} + \sqrt{x} = 2 \Rightarrow \begin{cases} \sqrt[3]{y_1} + \sqrt{x_1} = 2 \\ \sqrt[3]{y_2} + \sqrt{x_2} = 2 \end{cases} \xrightarrow{x_1=x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$ تابع است ✓

الف) $\tan \frac{\pi}{3} \rightarrow \frac{\pi}{3} = 60^\circ \Rightarrow \begin{cases} \frac{1}{\sqrt{3}} \sim \cos \\ \frac{1}{\sqrt{3}} \sim \sin \end{cases} \tan = \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = \sqrt{3}$

ب) $\cot \frac{\sqrt{\pi}}{4} \rightarrow \frac{\sqrt{\pi}}{4} = 11^\circ \Rightarrow \begin{cases} -\frac{\sqrt{3}}{4} \sim \cos \\ -\frac{1}{4} \sim \sin \end{cases} \cot = \frac{-\frac{\sqrt{3}}{4}}{-\frac{1}{4}} = \sqrt{3}$

ج) $\tan 33^\circ \rightarrow 33^\circ \Rightarrow \begin{cases} \frac{\sqrt{3}}{4} \sim \cos \\ -\frac{1}{4} \sim \sin \end{cases} \tan = \frac{-\frac{1}{4}}{\frac{\sqrt{3}}{4}} = -\frac{1}{\sqrt{3}}$

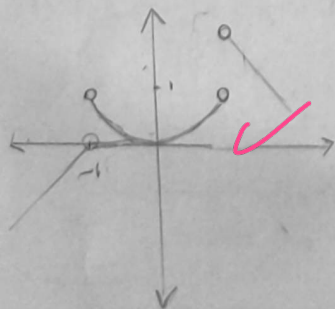
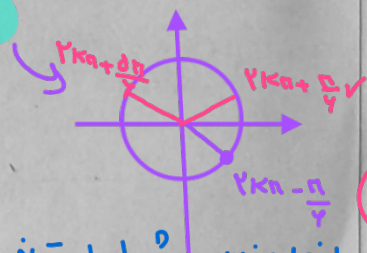
د) $\cot 11^\circ \rightarrow 11^\circ \Rightarrow \begin{cases} -1 \sim \cos \\ 0 \sim \sin \end{cases} \cot = \frac{-1}{0} = \infty$ تعریف نشده

الف) $\sin \alpha = \frac{1}{\sqrt{2}} \rightarrow \alpha = 2k\pi + \frac{\pi}{4}$ یا $2k\pi - \frac{\pi}{4}$

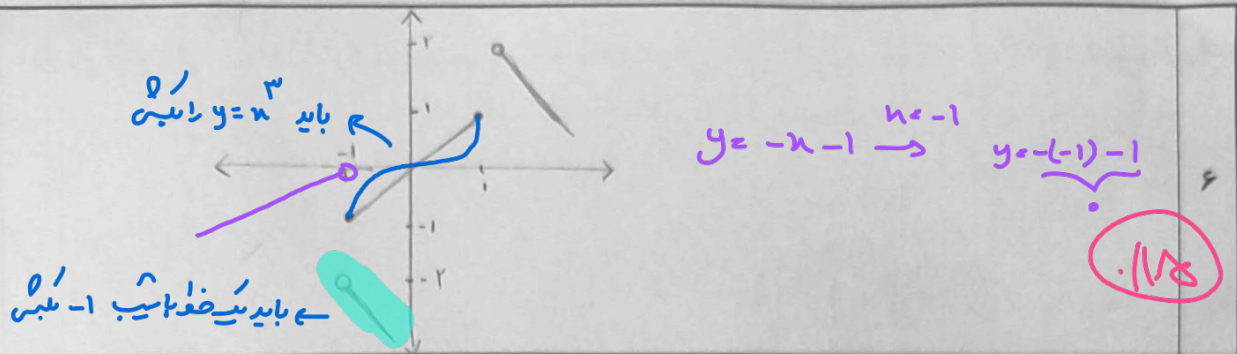
ب) $\cos \alpha = \frac{\sqrt{2}}{2} \rightarrow \alpha = 2k\pi + \frac{\pi}{4}$ یا $2k\pi - \frac{\pi}{4}$

$\sin \frac{5\pi}{4} = -\frac{1}{\sqrt{2}}$ یا $\sin 135^\circ$

اینجا نیز همینه $-\frac{1}{\sqrt{2}}$ است نه $\frac{1}{\sqrt{2}}$



د



الف) $y = (x-2)(x-3)(x-4)$

$x-2=0 \rightarrow x=2$ $x-3=0 \rightarrow x=3$ $x-4=0 \rightarrow x=4$

$x-3=0 \rightarrow x=3$

$\frac{2}{-} \frac{3}{+} \frac{4}{+}$

ب) $y = (x-2)(x-3)^2(x-4)$

$x-2=0 \rightarrow x=2$

$(x-3)^2=0 \rightarrow x-3=0 \rightarrow x=3$

$x-4=0 \rightarrow x=4$

$\frac{2}{+} \frac{3}{-} \frac{4}{+}$

الف) $\frac{(x-2)(x-4)}{x-3}$

$x-2=0 \rightarrow x=2$ $x-4=0 \rightarrow x=4$

$x-3=0 \rightarrow x=3$

$\frac{2}{-} \frac{3}{+} \frac{4}{+}$

ب) $\frac{(x-2)(x-4)}{(x-3)^2}$

$x-2=0 \rightarrow x=2$ $x-4=0 \rightarrow x=4$

$x-3=0 \rightarrow x=3$

$\frac{2}{+} \frac{3}{-} \frac{4}{+}$

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

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

$x^2 + x - 2 = (x+2)(x-1)$

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

$\frac{1}{+} \frac{2}{-} \frac{3}{+}$

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

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

$x^2 - 4x + 4 = (x-2)^2$

$\frac{1}{+} \frac{2}{+} \frac{3}{+}$

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

$x^2 + x + 2: \Delta = b^2 - 4ac \rightarrow a=1, b=1, c=2 \Rightarrow \Delta = 1 - (4 \times 1 \times 2) = -7$

$\Delta < 0$ پس هیچ ریشه حقیقی ندارد

$0 = x^2 - x^2 \Rightarrow x^2(x^2 - 1) = 0 \Rightarrow x^2 = 0 \rightarrow x = 0$

$x^2 - 1 = 0 \rightarrow x^2 = 1 \rightarrow x = \pm 1$

$\frac{1}{+} \frac{0}{-} \frac{1}{+}$

ب) $\frac{x^2 + 3x + 4}{x^2 + 2x + 3} = y$

$\Delta: b^2 - 4ac = 9 - 12 = -3$

$\Delta < 0$ پس هیچ ریشه حقیقی ندارد

$\Delta: 4 - 12 = -8$

$\Delta < 0$ پس هیچ ریشه حقیقی ندارد

این عبارت
تجزیه نمی شود

y

