

الف) $\left. \begin{aligned} y_1^2 &= 2x_1^2 - 1 \\ y_2^2 &= 2x_2^2 - 1 \end{aligned} \right\} \begin{aligned} x_1 &= x_2 \\ y_1 &= y_2 \end{aligned} \Rightarrow y_1^2 = y_2^2 \Rightarrow y_1 = y_2 \Rightarrow y_1 = y_2 \quad \checkmark$ تابع است

ب) $\left. \begin{aligned} y_1^2 + y_1 &= 2x_1^2 - 1 \\ y_2^2 + y_2 &= 2x_2^2 - 1 \end{aligned} \right\} \begin{aligned} x_1 &= x_2 \\ y_1^2 + y_1 &= y_2^2 + y_2 \end{aligned} \Rightarrow y_1^2 - y_2^2 + y_1 - y_2 = 0$

$(y_1 - y_2)(y_1 + y_2 + 1)(y_1 + y_2) = (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0 \Rightarrow A = 0$
 $\Rightarrow \Delta = y_2^2 - 4(y_1^2 + 1) = -2y_2^2 - 4 < 0 \Rightarrow \Delta < 0 \Rightarrow A = 0 \Rightarrow y_1 = y_2 \Rightarrow \checkmark$ تابع است

الف) $\left. \begin{aligned} y_1 &= x_1^2 - 1 \\ y_2 &= x_2^2 - 1 \end{aligned} \right\} \begin{aligned} x_1 &= x_2 \\ y_1 &= y_2 \end{aligned} \Rightarrow y_1 = y_2 \quad \checkmark$ تابع است

ب) $|y| + xy = x^2 + 1 \Rightarrow |y| = 1 \Rightarrow y = 1 \text{ یا } y = -1 \quad \checkmark$ تابع است

ج) $\left. \begin{aligned} y_1^2 + x_1^2 &= 2x_1^2 - 1 \\ y_2^2 + x_2^2 &= 2x_2^2 - 1 \end{aligned} \right\} \begin{aligned} x_1 &= x_2 \\ y_1^2 &= y_2^2 \end{aligned} \Rightarrow y_1 = y_2 \Rightarrow y_1 = y_2 \quad \checkmark$ تابع است

د) $\sqrt[3]{y} + \sqrt[3]{x} = 2 \Rightarrow \sqrt[3]{y} = 2 - \sqrt[3]{x} \Rightarrow y = (2 - \sqrt[3]{x})^3 \Rightarrow \checkmark$ تابع است

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

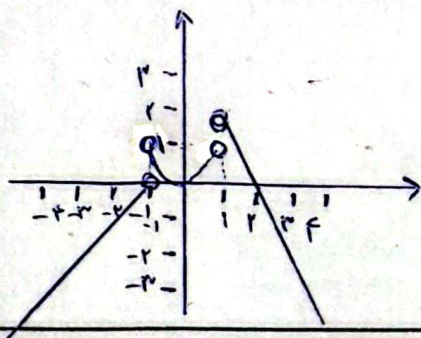
ب) $\cos \frac{\pi}{6} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

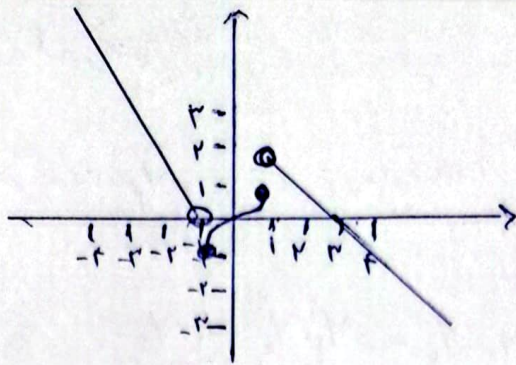
ج) $\tan 135^\circ = \frac{-\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = -1$

د) $\cos 135^\circ = -\frac{1}{\sqrt{2}}$

الف) $\sin \alpha = \frac{1}{3} \Rightarrow \begin{cases} \alpha = \frac{\pi}{6} \\ \alpha = \frac{5\pi}{6} \end{cases}$

ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \begin{cases} \alpha = \frac{\pi}{4} \\ \alpha = \frac{7\pi}{4} \end{cases}$





الف) $Y = \frac{(x-r)(x-r)(x-r)}{(x-r)(x-r)(x-r)} \Rightarrow \frac{r}{-r+r-r} \quad D_f = [r, r] \cup [r, +\infty)$

ب) $Y = \frac{(x-r)(x-r)(x-r)}{(x-r)(x-r)(x-r)} \Rightarrow \frac{r}{+r-r-r} \quad D_f = (-\infty, r] \cup \{r\} \cup [r, +\infty)$

الف) $Y = \frac{(x-r)(x-r)}{x-r} \Rightarrow \frac{r}{-r+r-r} \quad D_f = [r, r] \cup [r, +\infty)$

ب) $Y = \frac{(x-r)(x-r)}{(x-r)r} \Rightarrow \frac{r}{+r-r-r} \quad D_f = (-\infty, r] \cup [r, +\infty)$

الف) $Y = \frac{x^2-rx+r}{x-r} = \frac{(x-1)(x+r)}{x-r} \Rightarrow \frac{-r}{+r-r-r} \quad D_f = (-\infty, -r] \cup \{1\} \cup (r, +\infty)$

ب) $Y = \frac{x^2-rx+r}{x^2-rx+r} \Rightarrow \frac{r}{+r+r-r} \quad D_f = (-\infty, 1) \cup (1, r] \cup (r, +\infty)$

الف) $Y = \frac{x^2-x}{x^2+x+r} = \frac{x(x-1)}{x^2+x+r} \Rightarrow \frac{-1}{+r-r-r} \quad D_f = (-\infty, -1] \cup \{0\} \cup [1, +\infty)$

ب) $Y = \frac{\overbrace{x^2+rx+r}^A}{\underbrace{x^2+rx+r}_B} \Rightarrow \Delta_A < 0, \Delta_B < 0 \Rightarrow \text{جميع قيم } x \text{ مقبولة} \quad D_f = \mathbb{R}$