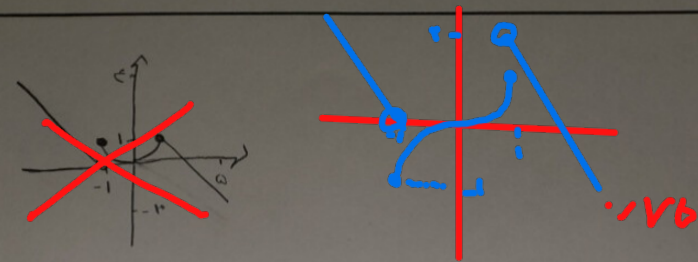
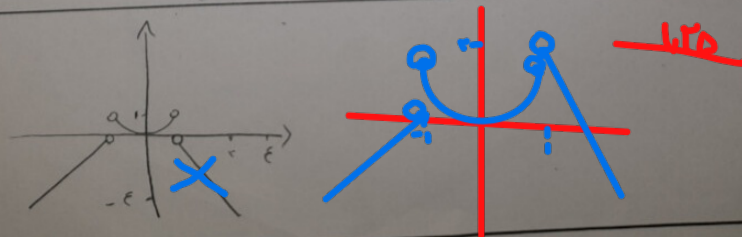


الف) $y^3 = 2x^2 - 1 \rightarrow y^3 = 2x^2 - 1$
 $x_1 = x_2, y_1^3 = y_2^3 \rightarrow y_1 = y_2$ ✓
 ب) $y^3 = 3x^2 - 1 \rightarrow y^3 = 3x^2 - 1$
 $x_1 = x_2, y_1^3 = y_2^3 \rightarrow y_1 = y_2$ ✓
 ج) $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$
 $y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow y_1 = y_2$ ✓

الف) $y = x^3 - 1$ ✓
 ب) $|1+x| = x^2 + 1 \rightarrow |1+x| = 1 \rightarrow y = -1$ ✓
 ج) $y^2 + x^2 = 2x - 1 \rightarrow y^2 = 2x - x^2 - 1 \rightarrow y^2 = -x^2 + 2x - 1 \rightarrow y^2 = -(x-1)^2 \rightarrow y = 0$ ✓
 د) $\sqrt{y} + \sqrt{x} = 2 \rightarrow \sqrt{y} = 2 - \sqrt{x} \rightarrow y = (2 - \sqrt{x})^2 \rightarrow y = 4 - 4\sqrt{x} + x$ ✓

الف) $\tan \frac{\pi}{4} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$ ✓
 ب) $\cot \frac{\sqrt{3}\pi}{4} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$ ✓
 ج) $\tan 30^\circ = \frac{1}{\sqrt{3}}$ ✓
 د) $\cot 180^\circ = -\frac{1}{0}$ ✓

الف) $\sin a = \frac{1}{2} \rightarrow a = 30^\circ \text{ و } 150^\circ$
 $\downarrow \quad \downarrow$
 $\frac{\pi}{6} \quad \frac{5\pi}{6}$
 ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow a = 45^\circ \text{ و } 315^\circ$
 $\downarrow \quad \downarrow$
 $\frac{\pi}{4} \quad \frac{7\pi}{4}$



الف) $y = (x-2)(x-3)(x-4)$
 $D_f = \mathbb{R}$
 ب) $y = (x-2)(x-3)(x-4)$
 $D_f = \mathbb{R}$

الف) $y = \frac{(x-2)(x-4)}{x-3} \rightarrow x-3 \neq 0 \rightarrow x \neq 3$
 $D_f = \mathbb{R} - \{3\}$
 ب) $y = \frac{(x-2)(x-4)}{(x-3)^2} \rightarrow (x-3)^2 \neq 0 \rightarrow x \neq 3$
 $D_f = \mathbb{R} - \{3\}$

الف) $y = \frac{x^3 - 3x^2 + 2}{x-2} \rightarrow x^3 - 3x^2 + 2 = 0 \rightarrow x = 2, x = 1, x = -1$
 $D_f = \mathbb{R} - \{2\}$
 ب) $y = \frac{x^3 - 3x^2 + 2}{x^2 - 5x + 4} \rightarrow x^2 - 5x + 4 = 0 \rightarrow x = 1, x = 4$
 $D_f = \mathbb{R} - \{1, 4\}$

الف) $y = \frac{x^2 - x^3}{x^2 + x + 2} \rightarrow x^2 - x^3 = x^2(x-1) \rightarrow x^2(x-1)(x+1)$
 $x^2 + x + 2 > 0$
 ب) $y = \frac{x^2 + 2x + 4}{x^2 + 2x + 3} \rightarrow x^2 + 2x + 4 > 0$
 $x^2 + 2x + 3 > 0$

ج، این رابطه تابع است و نباید مثال نقض بنویس

$$y^3 + x^3 = 2x - 1$$

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

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

$$\xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2$$

تابع است.

د، این رابطه تابع است و نباید مثال نقض بنویس

$$\sqrt[3]{y} + \sqrt[3]{x} = 1$$

تعریف ریاضی

$$\sqrt[3]{y_1} + \sqrt[3]{x_1} = 1$$

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

$$\xrightarrow{x_1 = x_2 = x} \begin{matrix} \sqrt[3]{y_1} + \sqrt[3]{x} = 1 \\ \sqrt[3]{y_2} + \sqrt[3]{x} = 1 \end{matrix} \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2$$