

$$A \times B - B^2 = \underbrace{(A-B)}_{\{1\}} \underbrace{B}_{\{2,3\}} = \{(1,2), (1,3)\}$$

$$A \times B = \{(1,2), (1,3), (2,2), (2,3), (3,2), (3,3)\}$$

$$B \times B = \{(2,2), (2,3), (3,2), (3,3)\}$$

$$A \times B - B^2 = \{(1,2), (1,3)\}$$

الف) $f(x) = \{(2, m^2), (2, 1), (-2, m), (-2, m), (2, m^2), (2, 4)\}$

$m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow \begin{cases} m = 2 \\ m = -1 \end{cases}$

$m = -1$

ب) $g(x) = \{(2, m^2), (2, 1), (2, 4), (3, m^2), (-2, m), (-2, 3)\}$

$\begin{cases} m^2 = m + 2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow \begin{cases} m = 2 \\ m = -1 \end{cases} \\ m = 2 \rightarrow (2, 1) \text{ و } (2, 4) \text{ خ } \\ m = -1 \rightarrow (-1, 4) \text{ و } (4, 3) \text{ خ } \end{cases}$

ع قه ۲
خ قه ۱
از این معادله ها
تابع نیست.

$$f(x) = \begin{cases} x^2 - 1; & x \leq 1 \\ ax + b; & 1 < x \leq 2 \\ x^2; & x \geq 2 \end{cases}$$

$x=1 \rightarrow 1-1 = a+b = 0$ $x=2 \rightarrow 4a+b = 4$

$\begin{cases} -a-b=0 \\ 4a+b=4 \end{cases} \rightarrow \begin{cases} a=-1 \\ b=1 \end{cases}$

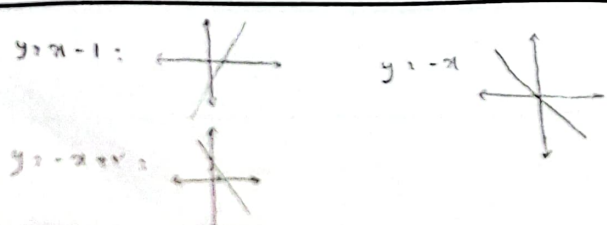
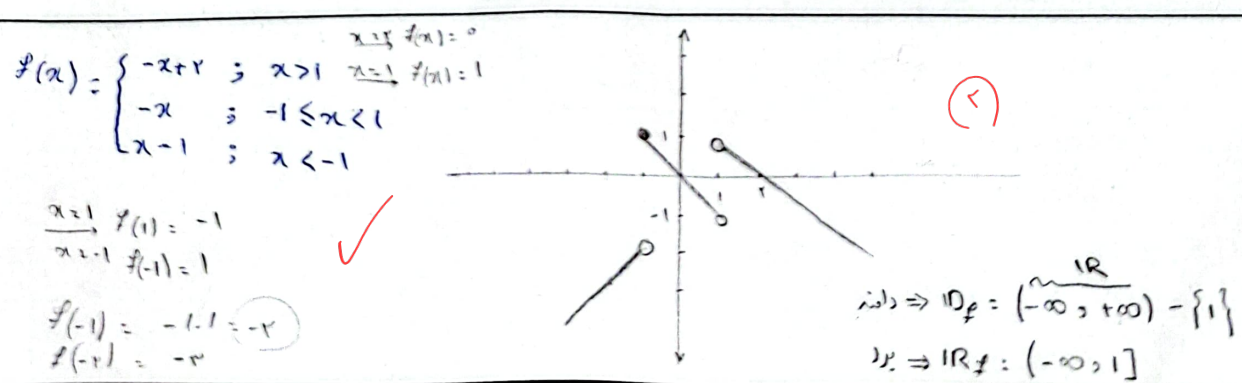
$ax+b = 1(-1) = -1$

$$f(x) = \begin{cases} 2x-2; & x \geq h \\ 4-3x; & x \leq h \end{cases}$$

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

$5h = 6 \Rightarrow h = \frac{6}{5}$

تابع متناهی



الف) $xy^2 + x^2 + 1 = 0$

$x^2 + 1 = -xy^2$
 $x^2 + 1 = -xy^2$
 $\left. \begin{matrix} x^2 + 1 = -xy^2 \\ x^2 + 1 = -xy^2 \end{matrix} \right\} \begin{matrix} x^2 = -xy^2 \\ x^2 = -xy^2 \end{matrix}$
 $y_1 = y_2$
 تابع هست ✓

ب) $x^2 + 4y^2 - 2x - 12y + 16 = 0$
 $(x^2 - 2x + 1) + (4y^2 - 12y + 9) = 0$
 $(x-1)^2 + (2y-3)^2 = 0$

$\begin{cases} x=1 \\ y=\frac{3}{2} \end{cases}$ (1, 1.5)
 تابع هست ✓

الف) $x \sin y = y \sin x$

شماره ۱
 $x=0 \rightarrow 0 \times \sin y = y \times 0$
 $\rightarrow 0 = y \times 0$

$y \in \mathbb{R}$ تابع نیست چون
 $\Rightarrow X$ ✓

ب) $(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}})^2 = (x)^2$ ✓

$\frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{x}{y} \times \frac{y}{x}} = 4$

$\frac{x^2 + y^2}{xy} = 4 \Rightarrow x^2 + y^2 - 4xy = 0$

$(x-y)^2 = 0 \Rightarrow x=y$ ✓ تابع هست

الف) $y = \sqrt{\frac{x-1}{x-3}} \geq 0$
 $\sqrt{\frac{x-1}{x-3}} \geq 0$

$\begin{matrix} x & 1 & 3 \\ + & - & - \end{matrix}$
 $I: (-\infty, 1] \cup (3, +\infty)$

$D_f: I \cap II: (0, 1]$ ✓

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{2}$

$\begin{cases} x \geq 1 \\ y-1 \geq 0 \end{cases} \rightarrow \sqrt{x} - \sqrt{y-1} \geq 0$ (2)

$\sqrt{y-1} = \sqrt{x} - \sqrt{y-1}$

$\sqrt{x} - \sqrt{y-1} \geq 0 \rightarrow \sqrt{x} \geq \sqrt{y-1} \rightarrow x \geq y-1$

$D_f: I \cap II: [1, 2]$ ✓

الف) $\sqrt{x^2 - 4x + 4} \geq 0$
 $\sqrt{x^2 - 4x + 4} \geq 0$

$\begin{matrix} x & 1 & 2 & 4 \\ + & - & - & + \end{matrix}$

ب) $\sqrt{\frac{x^2 - 4x + 4}{x^2 - 6x + 14}} \geq 0$
 $\sqrt{\frac{(x-2)^2}{(x-2)(x-7)}} \geq 0$

$D_f: (-\infty, 2] \cup (2, 4] \cup (4, +\infty)$ (2)

$D_f: I \cap II$

$\begin{matrix} x & 1 & 2 & 4 \\ + & - & - & + \end{matrix} \rightarrow III: (-\infty, 2) \cup (4, +\infty) \Rightarrow D_f: I \cap III: (-\infty, 2] \cup (4, +\infty)$

الف) $y = \sqrt{\frac{2x^2 - 5x + 2}{3x^2 - 4x + 2}} \geq 0$

$2x^2 - 5x + 2 \geq 0$
 $(a+b+c=0) \rightarrow \begin{cases} x = \frac{c}{a} = \frac{2}{2} \\ x = 1 \end{cases}$
 $\begin{matrix} x & 1 & \frac{2}{3} \\ + & - & + \end{matrix} \rightarrow (-\infty, 1] \cup [\frac{2}{3}, +\infty): I$

$3x^2 - 4x + 2 \geq 0$
 $(a+b+c=0) \rightarrow \begin{cases} x = \frac{c}{a} = \frac{2}{3} \\ x = 1 \end{cases}$
 $\begin{matrix} x & 1 & \frac{2}{3} \\ + & - & + \end{matrix} \rightarrow (-\infty, 1] \cup [\frac{2}{3}, +\infty): II$

$D_f: I \cap II: (-\infty, 1] \cup [\frac{2}{3}, +\infty)$

ب) $\sqrt{\frac{2x^2 - 5x + 2}{3x^2 - 4x + 2}} \geq 0$ ✓

$\begin{cases} x=1 \\ x=\frac{2}{3} \end{cases} \Rightarrow \begin{matrix} x & 1 & \frac{2}{3} \\ + & - & + \end{matrix}$

$D_f: (-\infty, \frac{2}{3}) \cup \{1\} \cup [\frac{2}{3}, +\infty)$

$D_f: (-\infty, 1] \cup (1, \frac{2}{3}) \cup [\frac{2}{3}, +\infty)$