

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

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

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

نمونه سرد

$$m^2 = m + 1 \Rightarrow m^2 - m - 1 = 0 \Rightarrow (m-2)(m+1) = 0 \quad m \neq 2 \Rightarrow m = -1$$

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

$$m^2 = m + 1 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m \neq -1, 2$$

نمونه سرد

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

$$1^2 - 1 = a + b \Rightarrow a + b = 0$$

$$2^2 = 2a + b \Rightarrow 2a + b = 4$$

$$1(1) + b = 1 \Rightarrow b = -1 \quad a + b = 0 \Rightarrow a = 1$$

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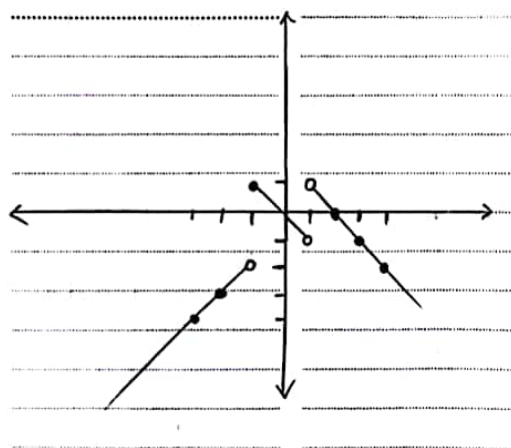
$$f(x) = \begin{cases} 2x - 3 & ; x \geq k \\ 4 - 3x & ; x \leq k \end{cases} \quad 1k - 3 = 4 - 3k \Rightarrow 4k = 7 \quad k = \frac{7}{4}$$

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$$f(x) = \begin{cases} -x + 1 & ; x > 1 \\ -x & ; -1 \leq x < 1 \\ x - 1 & ; x < -1 \end{cases}$$

$$D_f = \mathbb{R} - \{1\}$$

$$R_f = (-\infty, 1]$$



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✓ (۲)

الف) $y^3 + x^2 + 1 = 0$

حل منقش $\begin{cases} y_1^3 = -x_1^2 - 1 \\ y_2^3 = -x_2^2 - 1 \end{cases} \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ (جواب است) (1)

ب) $x^2 + 4y^2 - 2x - 12y + 10 = 0 \Rightarrow 4y^2 - 12y = -x^2 + 2x - 10$ (جواب است)

حل منقش $\begin{cases} 4y_1^2 - 12y_1 = -x_1^2 + 2x_1 - 10 \\ 4y_2^2 - 12y_2 = -x_2^2 + 2x_2 - 10 \end{cases} \Rightarrow 4y_1^2 - 12y_1 = 4y_2^2 - 12y_2$
 $\Rightarrow 4(y_1^2 - 3y_1) = 4(y_2^2 - 3y_2) \Rightarrow y_1(y_1 - 3) = y_2(y_2 - 3)$

الف) $x \sin y = y \sin x \Rightarrow x = 1 \Rightarrow \sin y = y$ (جواب است) (2)
 مثل نقش $y = 0, y = 180^\circ, y = 360^\circ, \dots$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \Rightarrow \left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}}\right)' = 0 \Rightarrow \frac{x}{y} + 2 + \frac{y}{x} = 4$

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

$\Rightarrow (x - y)^2 = 0$ (جواب است) (3)

الف) $y = \sqrt{\frac{x-1}{x-4}} + \sqrt{\frac{2-x}{x}} \Rightarrow \frac{x-1}{x-4} \geq 0 \Rightarrow (-\infty, 1] \cup (4, +\infty)$ (150)
 $\frac{2-x}{x} \geq 0 \Rightarrow (0, 2] \Rightarrow (0, 1] \cup (4, 2]$ (جواب است)

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3} \Rightarrow (\sqrt{y-1})^2 = (\sqrt{3} - \sqrt{x})^2 \Rightarrow y-1 = 3 - 4\sqrt{x} + x$

$\Rightarrow y = -4\sqrt{x} + x + 4 \Rightarrow D_f = \mathbb{R}$ (جواب است) (4)

الف) $y = \sqrt{x^2 - 7x + 6} \Rightarrow x^2 - 7x + 6 \geq 0 \Rightarrow (x-1)(x-6) \geq 0$ (1)

$\sqrt{x^2 - 10x + 16} \Rightarrow x^2 - 10x + 16 > 0 \Rightarrow (x-2)(x-8) > 0$ (II)

(I) $\Rightarrow (-\infty, 1] \cup [6, +\infty)$ (II) $\Rightarrow (-\infty, 2) \cup (8, +\infty)$

$I \cap II = (-\infty, 1] \cup (8, +\infty)$

$x \leq 1$

(150)

$$ب) y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 10x + 14}} \geq 0 \Rightarrow \frac{(x-1)(x-4)}{(x-2)(x-1)} \geq 0$$

x	1	2	4	1
y	+	-	+	-

$$\Rightarrow D = (-\infty, 1] \cup (2, 4] \cup (1, +\infty)$$

$$الف) y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 4x + 4}} \geq 0 \Rightarrow x^2 - 4x + 3 \geq 0 \quad (I)$$

$$\Rightarrow (x-1)(x-3) \geq 0 \Rightarrow x_1 = 1 / x_2 = 3$$

$$x^2 - 4x + 4 > 0 \Rightarrow x^2 - 4x + 12 > 0 \Rightarrow (x-2)(x-6) > 0 \quad (II)$$

$$x_1 = 1 / x_2 = \frac{4}{3}$$

x	1	$\frac{4}{3}$
y	+	-

$$(I) \Rightarrow (-\infty, 1] \cup [\frac{4}{3}, +\infty)$$

x	1	$\frac{4}{3}$
y	+	-

$$(II) \Rightarrow (-\infty, 1) \cup (\frac{4}{3}, +\infty)$$

$$I \cap II = (-\infty, 1) \cup [\frac{4}{3}, +\infty)$$

$$ب) \sqrt{\frac{x^2 - 4x + 3}{x^2 - 4x + 4}} \geq 0 \Rightarrow \frac{x^2 - 4x + 3}{x^2 - 4x + 4} \geq 0 \Rightarrow \frac{(x-1)(x-3)}{(x-2)(x-2)} \geq 0$$

x	1	$\frac{4}{3}$	2
y	+	+	-

$$\Rightarrow (-\infty, 1) \cup (1, \frac{4}{3}) \cup [\frac{4}{3}, +\infty)$$