

(1)

$$\textcircled{1} A = \{1, 2, 3\} \Rightarrow A \times B - B^c = \{-1, -4, 0, -3, 2\}$$

$$B = \{2, 3\}$$

$$1 \times 2 = 2, 1 \times 3 = 3, 2 \times 2 = 4, 2 \times 3 = 6, 3 \times 2 = 6, 3 \times 3 = 9$$

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

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

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

$$2 \text{ و } -1$$

(2)

$$m = 2, -1$$

$$-1$$

$$\textcircled{3} g(x) = \{(x, m^2), (2, 1), (m, 0), (x, m+2), (-2, m), (-1, 2)\}$$

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

$$-1 \text{ و } 2$$

$$m = -1, 2$$

برای معادله مقدار تابع غیر ضروری

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

$$a \times b \quad (3) \\ \wedge x(-1) = -48$$

$$\begin{cases} 2a + b = 1 \\ a + b = 0 \end{cases}$$

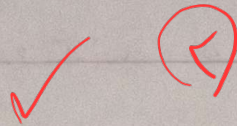
$$a = 1$$

$$b = -1$$

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

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

$$f(x) = \begin{cases} 2x-2 & x \geq k \\ \varepsilon - 2x & x \leq k \end{cases} \quad \begin{matrix} x=k \\ 2k-2 = \varepsilon - 2k \\ 0k = \varepsilon \Rightarrow k = \frac{\varepsilon}{0} \end{matrix}$$



(a) شش تابع را رسم کنید

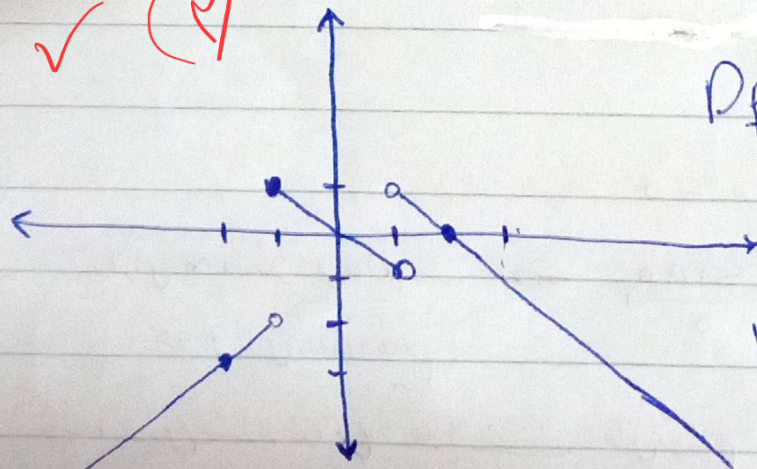
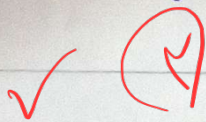
نقطه مرزی

$$f(x) = \begin{cases} -x+2 & x > 1 \\ -\infty & -1 \leq x < 1 \\ x-1 & x < -1 \end{cases}$$

x	1	2
y	1	0

x	-1	1
y	1	-1

x	-2	-1
y	-2	-1



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

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

$$(الف) 2y^x + x^x + 1 = 0$$

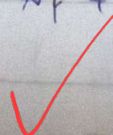
تابع صحت

$$\begin{aligned} 2y_1^x + x_1^x + 1 &= 0 & x_1 = x_2 \\ \Rightarrow 2y_2^x + x_2^x + 1 &= 0 \end{aligned}$$

$$2y_1^x = 2y_2^x$$

$$\Rightarrow y_1^x = y_2^x$$

$$\Rightarrow y_1 = y_2$$



$$-1) \quad x^2 + y^2 - 2x - 4y + 1 = 0$$

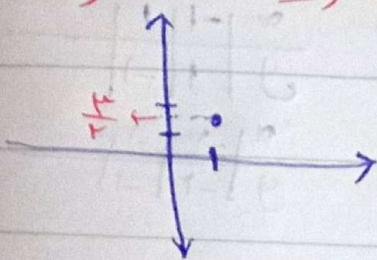
$$(x-1)^2 + (y-2)^2 = 0$$

مختصه مرکز

در عبارت $x^2 + y^2$ هر دو x و y در توان ۲ و ۰
بنابرین مرکز آن است.

$$x-1=0 \Rightarrow x=1$$

$$y-2=0 \Rightarrow y=2 \Rightarrow y=\frac{4}{2}$$



تابع مست

$$\text{الف) } x \sin y = y \sin x$$

$$x=0 \Rightarrow \sin 0 = 0$$

$$0 \times \sin y = y \sin 0 \Rightarrow$$

به ازای $x=0$ می توانیم

هر y ای را قرار دهیم.

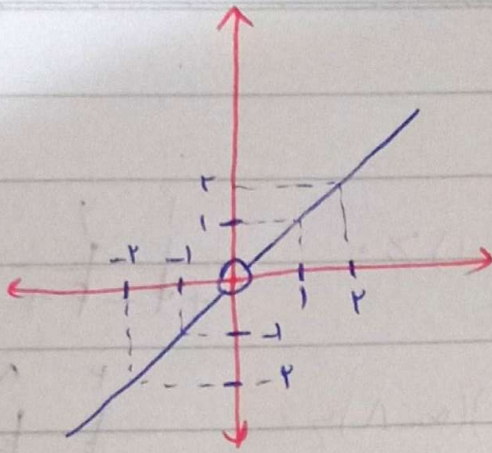
یک زوج مرتب (x, y) تابع $\sin$ مال مقعر

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

$$(\sqrt{a} + \sqrt{\frac{1}{a}} = 2) \cdot \frac{2}{\sqrt{a} + \sqrt{\frac{1}{a}}} \Rightarrow a + \frac{1}{a} + 2\sqrt{a \times \frac{1}{a}} = 2$$

$$a + \frac{1}{a} = 2 \Rightarrow \frac{a}{y} + \frac{y}{x} = 2$$

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



تابع مستطابق غور

①

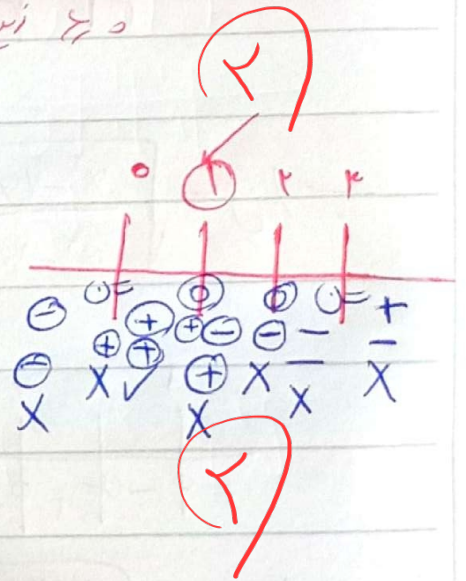
$$y = \sqrt{\frac{x-1}{x-2}} + \sqrt{\frac{x-2}{x}}$$

دست برداشتن

$$\frac{x-1}{x-2} \geq 0$$

$$\frac{x-2}{x} \geq 0$$

$$\begin{array}{c|c|c} 1 & 2 & \\ \hline + & - & + \\ \hline 0 & 2 & \\ \hline - & + & - \end{array}$$



$$D_f = (0, 1]$$

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

$$\Rightarrow \sqrt{y-1} = \sqrt{x} - \sqrt{x} \xrightarrow{\text{بزرگ}} |y-1|$$

①

$$\Rightarrow D_f = [0, 3]$$

$$y-1 = 0 \Rightarrow 3 + |x| - 2\sqrt{x} = 3 + |x| - 2\sqrt{x}$$

$$x \geq 0 \Rightarrow x \geq 0 \quad D_f = [0, +\infty)$$

$$D_f = [0, +\infty)$$

$$y-1 \geq 0 \Rightarrow y = 3 + |x| - 2\sqrt{x} + 1$$

$$x \geq 0 \Rightarrow x \geq 0$$

$$y-1 \leq 0 \Rightarrow -y+1 = 3 + |x| - 2\sqrt{x}$$

$$\sqrt{y-1}$$

$$-3 - |x| + 2\sqrt{x} + 1 = y$$

$$= \sqrt{3} - \sqrt{x}$$

$$\sqrt{3} - \sqrt{x} \geq 0 \Rightarrow \sqrt{3} \geq \sqrt{x}$$

$$x \leq 3$$

$$\sqrt{x}$$

$$x \geq 0 \Rightarrow x \geq 0$$

الف) $y = \sqrt{x^2 - 5x + 4}$

④

$x^2 - 5x + 4 \geq 0$

$x \leq 1$

$x^2 - 5x + 4 \geq 0 \Rightarrow (x-4)(x-1) \geq 0$

$\begin{array}{c} 1 \quad 4 \\ | \quad | \\ + \quad - \quad + \end{array}$

$x^2 - 5x + 4 \geq 0 \Rightarrow (x-2)(x-1) \geq 0$

$\begin{array}{c} 2 \quad 1 \\ | \quad | \\ + \quad - \quad + \end{array}$

$\cap D_f = (-\infty, 1] \cup (1, +\infty)$

$y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 6x + 14}} = \sqrt{\frac{(x-4)(x-1)}{(x-2)(x-1)}}$

$\frac{1}{1}$

$\begin{array}{c} 1 \quad 2 \quad 4 \quad 1 \\ | \quad | \quad | \quad | \\ + \quad - \quad + \quad - \quad + \end{array}$

$D_f = (-\infty, 1] \cup$

$(1, 4] \cup (1, +\infty)$

$\frac{4}{1} - \frac{18}{1} = 4$

الف) $y = \sqrt{\frac{2x^2 - 8x + 8}{x^2 - 5x + 6}}$

$\div 2$

$\begin{array}{c} 1 \quad 4 \\ | \quad | \\ + \quad - \quad + \end{array}$

$2x^2 - 8x + 8 = 0 \Rightarrow x^2 - 4x + 4 = 0$

$(x-2)^2 = 0$

$(x-2)(x-2) = 0$

$\frac{2}{2} = 1$

$\begin{array}{c} 1 \quad 4 \\ | \quad | \\ + \quad - \quad + \end{array}$

$2x^2 - 5x + 6 = 0 \Rightarrow x^2 - 5x + 14 = 0$

$(x-2)(x-7) = 0$

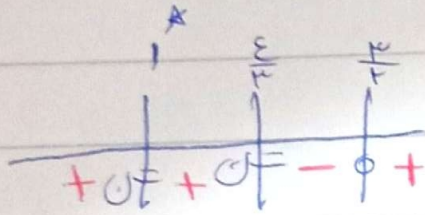
$\frac{2}{2} = 1$

١

$$D_f = (-\infty, 1) \cup \left[\frac{\mu}{\mu}, +\infty\right)$$

٢

$$ب) y = \sqrt{\frac{2\alpha^2 - 8\alpha + 3}{3\alpha^2 - 4\alpha + 2}}$$



$$D_f = (-\infty, 1)$$

$$\cup (1, \frac{\mu}{\mu}) \cup \left[\frac{\mu}{\mu}, +\infty\right)$$

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