

$$A = [1, 2, 3]$$

$$B = [2, 3]$$

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

$$B^T = \{(1,2), (2,2), (3,2), (3,3)\}$$

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

$$(r, m^r) = (r, m+r) \rightarrow m^r = m+r = 0 \quad -2$$

$$(m+1)(m-r) = 0 \rightarrow \begin{cases} m=-1 \checkmark \\ m=r \times \end{cases}$$

الف -

فقط $m=-1$ قابل قبول

$$ب - (r, m^r) = (r, m+r) \rightarrow m^r = m+r = 0$$

$$(m-r)(m+1) \rightarrow \begin{cases} m=-1 \times \\ m=r \times \end{cases}$$

هیچ مقداری

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

$$f(1) = 0$$

$$\rightarrow a = -b$$

$$f(1) = a+b$$

$$\rightarrow a = +1$$

$$f(r) = 2$$

$$\rightarrow 2a+b = 2$$

$$b = -1$$

$$f(r) = 2a+b$$

$$ab = -2$$

$$f(x) = \begin{cases} 2x-c & x \geq k \\ 2-cx & x \leq k \end{cases}$$

$$f(k) = 2k-c = 2-ck$$

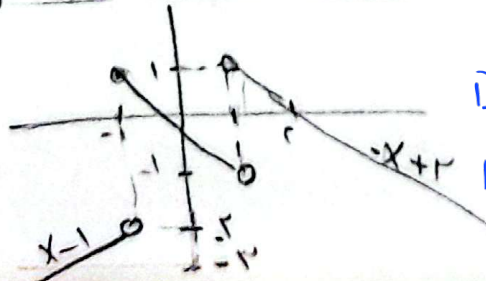
$$0k = v \rightarrow k = \frac{v}{0}$$

$$2y^2 + x^2 + 1 = 0 \rightarrow y = \sqrt{\frac{-1-x^2}{2}} \quad \text{تابع انت} \quad -4$$

$$ب) x^2 + 2y^2 - 2x - 12y + 1 = 0 \rightarrow (x-1)^2 + (2y-6)^2 = 0$$

$$x=1 \quad y=\frac{6}{2}$$

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



$$D_f = \mathbb{R} \quad R_f = (-\infty, 1]$$

$$\text{الف) } x \sin y = y \sin x \rightarrow \frac{\sin y}{y} = \frac{\sin x}{x}$$

تابع سین

-V

$$x = \frac{\pi}{2} \rightarrow \frac{\sin y}{y} = \frac{\frac{\sqrt{2}}{2}}{\frac{\pi}{2}} \rightarrow y = \frac{\pi}{2}$$

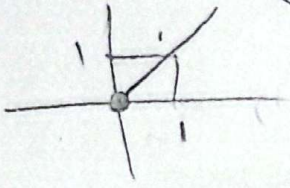
تابع سین با سینوس - تابع زوج
به غیر از $x=0$

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

$$\left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}}\right)^2 = 4 \rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4 \rightarrow y^2 + x^2 - 2xy = 0$$

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

$x=y$ به غیر از $x=y=0$ تابع است



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

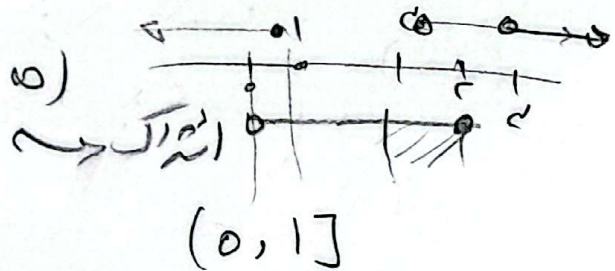
$$\frac{x-1}{x-2} \geq 0$$

x	$x-1$	$x-2$	$P(x)$
$-\infty$	-	-	+
1	0	-	-
2	+	0	+
$+\infty$	+	+	+

x	$2-x$	x	$P(x)$
$-\infty$	-	-	-
2	0	-	+
$+\infty$	-	+	-

$$P_1(x) \leadsto (-\infty, 1] \cup [2, +\infty)$$

$$P_2(x) \leadsto (0, 2]$$



$$(0, 1]$$

ب

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

$$y = (\sqrt{3} - \sqrt{x})^2 + 1 \rightarrow \sqrt{x} \rightarrow x \geq 0 \quad [0, +\infty)$$

1, 0

$$0 \leq y \leq 3$$

8 $y = \sqrt{\frac{x^2 - \sqrt{x} + 4}{x^2 - 1.2x + 14}}$

① $x^2 - 1.2x + 12 \neq 0$

② $\frac{x^2 - \sqrt{x} + 2}{x^2 - 1.2x + 12} \geq 0$

$(x-2)(x-1) > 0$

$(x-1)(x-2) > 0$

بـ

x	1	2	7	11
$x^2 - \sqrt{x} + 4$	+	-	-	+
$x^2 - 1.2x + 12$	+	+	-	+
	+	-	+	+

$Df = (+\infty, 1] \cup (2, 6] \cup (11, +\infty)$

الف

$2 - 1.2x + 4$

$\sqrt{\frac{x^2 - \sqrt{x} + 4}{x^2 - 1.2x + 14}}$

① $x^2 - \sqrt{x} + 2 > 0$

② $x^2 - 1.2x + 12 > 0$

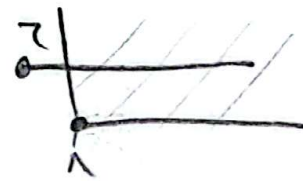
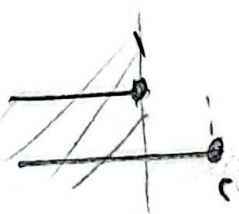
x	1	4
$x^2 - \sqrt{x} + 4$	+	+
$x^2 - 1.2x + 14$	+	+

x	2	11
$x^2 - 1.2x + 12$	+	+
	-	+

$Df = (-\infty, 1] \cup [4, +\infty)$

$Dg = (+\infty, 2] \cup [11, +\infty)$

بـ $Df \cap Dg \rightarrow$



$Df \cap Dg = (+\infty, 1] \cup [11, +\infty)$

1, 0

1.

1.1

$$\frac{\sqrt{rx^2 - 0x + c}}{\sqrt{rx^2 - vx + \varepsilon}}$$

$$\textcircled{1} rx^2 - 0x + c \geq 0$$

$$\textcircled{2} rx^2 - vx + \varepsilon \geq 0$$

$$rx^2 - 0x + c = (x-1)(rx - r) \rightarrow x = +1$$

$$rx^2 - vx + \varepsilon = (x-1)(rx - \varepsilon) = 0 \quad x = +\frac{r}{\varepsilon}$$

$$x = 1$$

$$x = \frac{\varepsilon}{r}$$

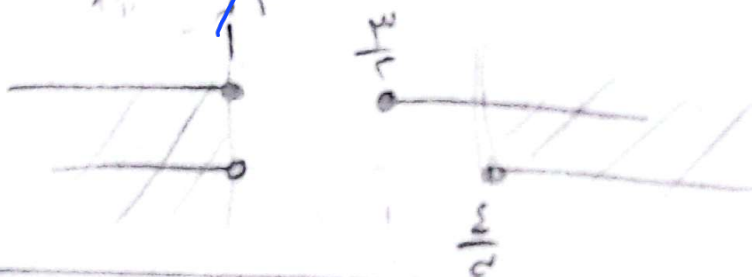
x	+1	$\frac{\varepsilon}{r}$
$rx^2 - 0x + c$	+	-

$$Df = (-\infty, +1] \cup [\frac{r}{\varepsilon}, +\infty)$$

x	1	$\frac{\varepsilon}{r}$
$rx^2 - vx + \varepsilon$	+	-

$$Dg = (-\infty, 1) \cup (\frac{\varepsilon}{r}, +\infty)$$

$$Df \cap Dg \Rightarrow (-\infty, 1) \cup (\frac{\varepsilon}{r}, +\infty)$$



$$y = \sqrt{\frac{rx^2 - 0x + c}{rx^2 - vx + \varepsilon}} \rightarrow \frac{rx^2 - 0x + c}{rx^2 - vx + \varepsilon} \geq 0, rx^2 - vx + \varepsilon \neq 0$$

x	-1	$\frac{\varepsilon}{r}$	$\frac{r}{\varepsilon}$
$rx^2 - 0x + c$	+	-	-
$rx^2 - vx + \varepsilon$	+	-	+

1,0

$$Df = (-\infty, +\frac{r}{\varepsilon}) \cup [\frac{r}{\varepsilon}, +\infty)$$