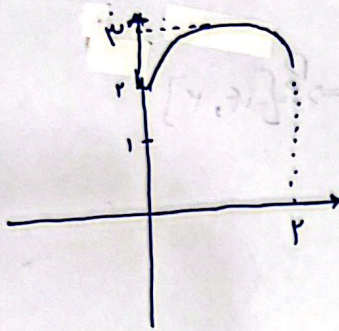
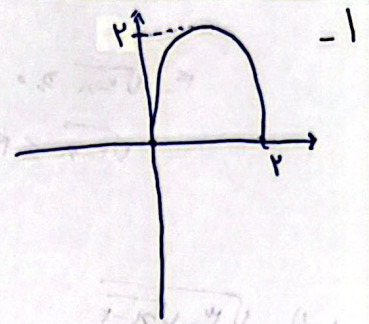


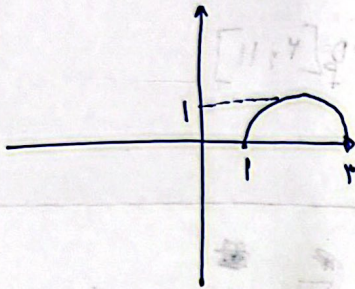
الف)



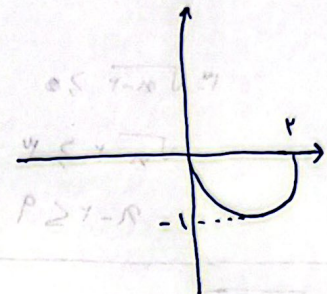
ب)



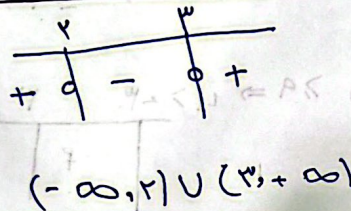
ج)



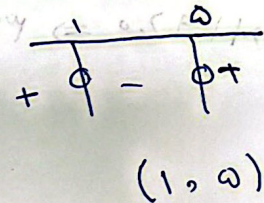
د)



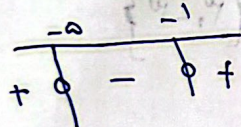
الف) $(x-2)(x-3) > 0$



ب) $(x-1)(x-5) < 0$

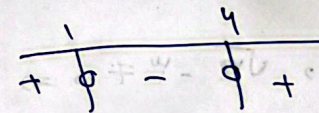


ج) $(x+1)(x+5) \geq 0$



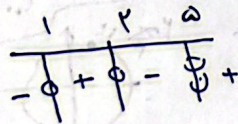
$(-\infty, -5] \cup [-1, +\infty)$

د) $(x-1)(x-4) \leq 0$



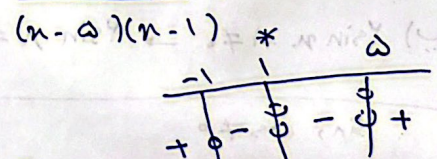
$[1, 4]$

الف) $\frac{(x-1)(x-2)}{x-5} < 0$



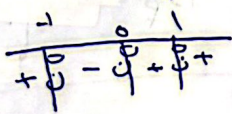
$(-\infty, 1) \cup (2, 5)$

ب) $\frac{(x+1)(x-1)}{(x-5)(x-1)} \geq 0$



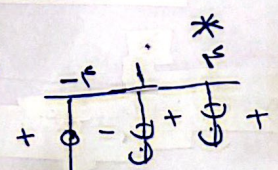
$(-\infty, -1] \cup (5, +\infty)$

الف) $\frac{(x-1)(x^2-x+1)}{x(x^2-1)}$
 $\Delta \rightarrow x^2-x+1$
 $\Delta \rightarrow x^2-1$
 $\rightarrow (x-1)(x+1)$



$D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

ب) $\sqrt{\frac{(x-4)(x+4)}{(x-4)(x-1)}}$



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

$$\sqrt{4-\sqrt{2-x}}$$

$$x-x \geq 0$$

$$x \geq x$$

$$4-\sqrt{2-x} \geq 0$$

$$\Rightarrow -1 \leq x \leq 2 \Rightarrow D_f = [-1, 2]$$

$$\sqrt{2-x} \leq 4 \rightarrow x-x \leq 14$$

$$-x \leq 14 \rightarrow x \geq -14$$

$$b) \sqrt{3-\sqrt{x-2}}$$

$$x-x \geq 0$$

$$x \geq 2$$

$$3-\sqrt{x-2} \geq 0$$

$$\Rightarrow 2 \leq x \leq 11 \Rightarrow D_f = [2, 11]$$

$$\sqrt{x-2} \leq 3 \Rightarrow x \leq 11$$

$$x-2 \leq 9$$

$$a) \sqrt{4-x^2} \Rightarrow 4-x^2 \geq 0 \Rightarrow x(x-x) \geq 0$$

$$\frac{-\sqrt{4}}{-1} + \frac{+\sqrt{4}}{+1}$$

$$D_f = [-2, +2]$$

$$b) 3|x| - 9 \geq 0 \Rightarrow 3|x| \geq 9 \Rightarrow |x| \geq 3$$

$$\Rightarrow D_f = x \leq -3 \cup x \geq +3$$

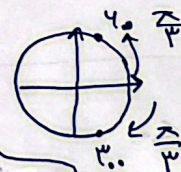
$$D_f = (-\infty, -3] \cup$$

$$[3, +\infty)$$

$$a) |x| - 3 \neq 0 \Rightarrow x \neq 3, -3 \Rightarrow D_f = R - \{3, -3\}$$

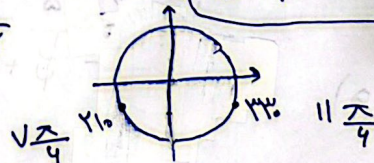
$$b) x \geq 0, \sqrt{x} - 3 \neq 0 \Rightarrow \sqrt{x} \neq 3 \Rightarrow x \neq 9 \Rightarrow D_f = [0, 9) \cup (9, +\infty)$$

$$a) x \cos x \neq 0 \rightarrow x \cos x \neq 1 \Rightarrow \cos x \neq \frac{1}{x}$$



$$D_f = R - \{x \mid x \cos x = 1\}$$

$$b) x \sin x \neq -1 \rightarrow x \sin x \neq -1 \Rightarrow \sin x \neq -\frac{1}{x}$$

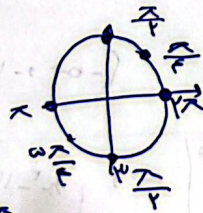


$$\sin, \cos \neq 0$$

$$c) \cot x \neq 1$$

$$\hookrightarrow$$

$$\cot x = 1 \Rightarrow \frac{\pi}{4}, \frac{5\pi}{4}$$

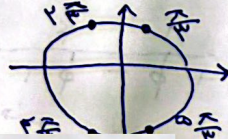


$$D_f = R - \{x \mid x \cot x = 1\}$$

$$d) x \sin^2 x - 3 \neq 0 \Rightarrow x \sin^2 x \neq 3 \Rightarrow \sin^2 x \neq \frac{3}{x}$$

$$\sin x \neq \pm \frac{\sqrt{3}}{\sqrt{x}}$$

$$D_f = R - \{x \mid x \sin^2 x = 3\}$$



$$y = \frac{1}{\sqrt{r|x-r| - \frac{1}{r}}}$$

$$r|x-r| - \frac{1}{r} > 0$$

$$r|x-r| > \frac{1}{r} \Rightarrow |x-r| > \frac{1}{r} \Rightarrow \begin{cases} x-r > \frac{1}{r} \\ x-r < -\frac{1}{r} \end{cases} \Rightarrow \begin{cases} x > \frac{1}{r} + r \\ x < -\frac{1}{r} + r \end{cases}$$

$$D_f = x < \frac{1}{r} + r \cup x > -\frac{1}{r} + r \quad D_f = (-\infty, \frac{1}{r} + r) \cup (-\frac{1}{r} + r, +\infty)$$

$$x < \frac{1}{r} + r$$

$$a) \quad r|x-r| \geq 0 \Rightarrow r|x-r| \leq r \Rightarrow |x-r| \leq 1 \Rightarrow \begin{cases} x \leq r+1 \\ x \geq r-1 \end{cases} \quad D_f = [r-1, r+1]$$

این شرط به این معنی است که $r|x-r|$ از صفر بزرگتر یا مساوی است.

$$b) \quad \frac{|x|}{|x|} \geq 0 \rightarrow |x| \neq 0 \quad D_f = \mathbb{R} - \{0\}$$