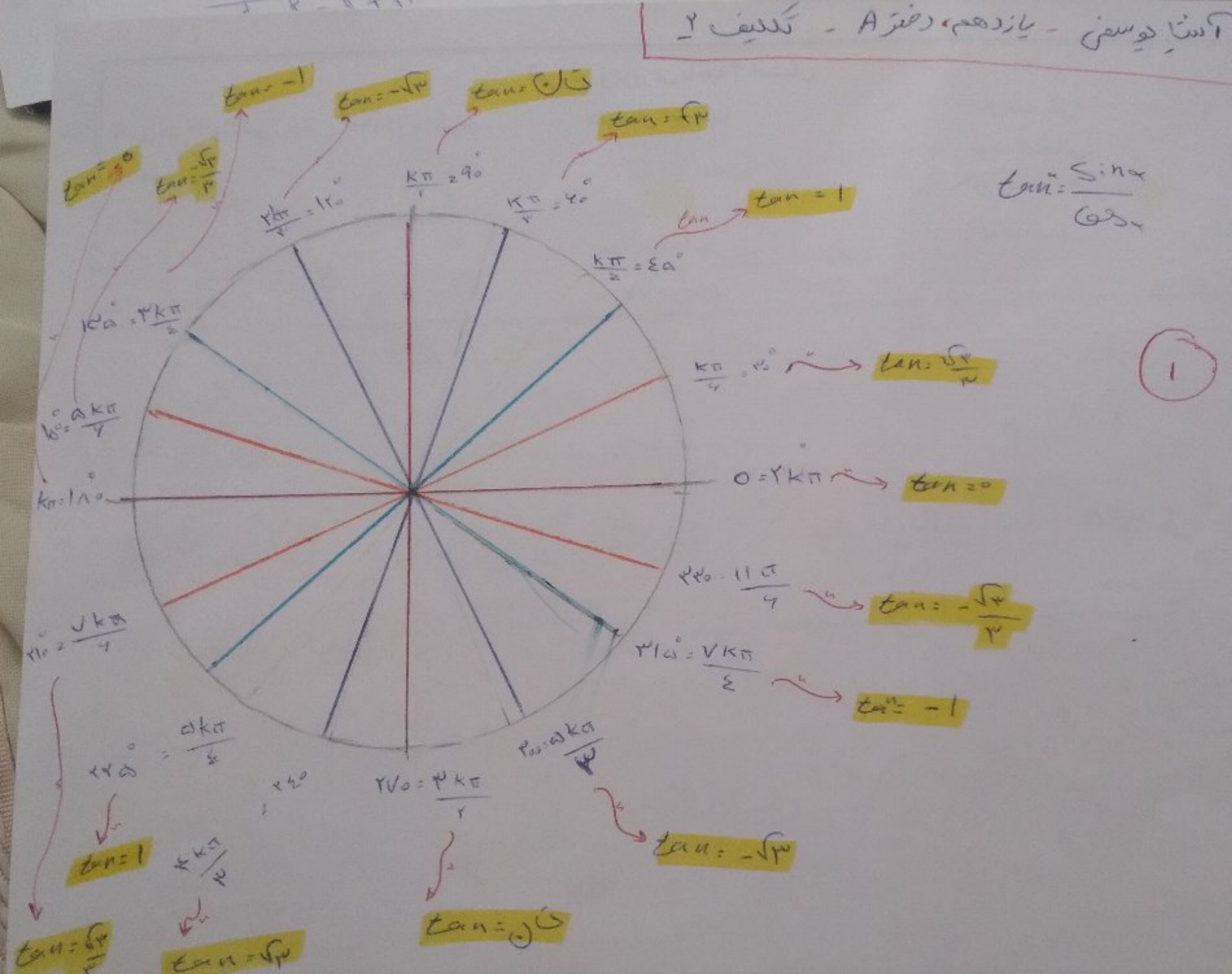




$$\tan = \frac{\sin}{\cos}$$

1

الف) $\frac{\sin \frac{\pi}{4}}{4} + \cos \frac{\pi}{4} + r \tan \frac{\pi}{4} = \frac{1}{4} - 1 + 1(-1) \Rightarrow \frac{1}{4} - 3 = -\frac{11}{4}$

ب) $-\cos \frac{3\pi}{4} + \frac{\sin \frac{\pi}{4}}{4} + r \sin \frac{\pi}{4} = -(-\frac{\sqrt{2}}{2}) + \frac{\sqrt{2}}{4} - 2(-\frac{\sqrt{2}}{4}) = \frac{3\sqrt{2}}{4}$

2

ج) $\cos \frac{\pi}{4} + \cos \frac{\pi}{4} - r \tan \frac{\pi}{4} = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 2(\frac{\sqrt{2}}{2}) = 0$

د) $\cos(\sin \alpha) + \sin(\pi \cos \frac{\pi}{4}) = \cos(0) + \sin(\frac{\pi}{2}) = 1 + 1 = 2$

$f(n) = \begin{cases} n^2 + \varepsilon n & n \geq a \\ r n + a + r & n \leq a \end{cases} \quad a > 0 \quad f(1) = ?$

3

$a^2 + \varepsilon a = r a + a + r$
 $a^2 + a - r = 0$
 $(a+r)(a-r) = 0$
 $a = 1 \Rightarrow f(1) = 1^2 + \varepsilon(1) = 1 + \varepsilon = a$

$f(n) = \begin{cases} r n^2 - b & |n+1| \geq r \\ a + r n & -r \leq n \leq -1 \end{cases}$

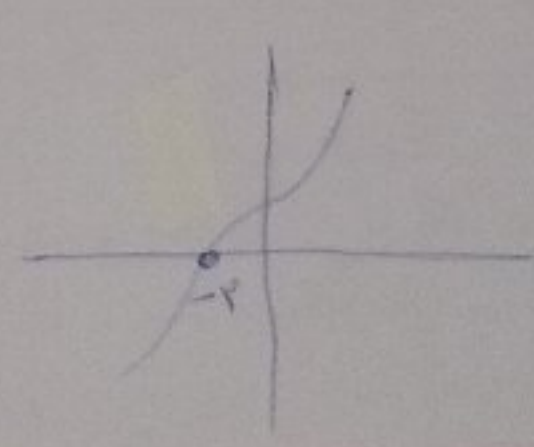
4

$r(-r)^2 - b = a + r(-r)$
 $1r + 4 = a + b$
 $r\varepsilon \geq a + b$

الف) $\frac{1}{y} = \frac{1}{2^r - \varepsilon n^r} \Rightarrow D_f = \mathbb{R} - \{0, \varepsilon\}$

5

ب) $\frac{1}{y} = \frac{1}{r n^2 + \varepsilon n^2 + a + \varepsilon} \Rightarrow D_f = \mathbb{R} - \{-r\}$



الف) $y = \sqrt{n^2 - 1} + \sqrt{n - r} \Rightarrow n^2 - 1 \geq 0 \Rightarrow n \geq 1$
 $n - r \geq 0 \Rightarrow n \geq r \Rightarrow n \geq \max(1, r) = [r, +\infty)$

6

ب) $y = \frac{\sqrt{4-n}}{\sqrt{4n-r}} \Rightarrow 4-n \geq 0 \Rightarrow n \leq 4$
 $4n-r > 0 \Rightarrow n > \frac{r}{4} \Rightarrow n \in (\frac{r}{4}, 4]$

$y = \sqrt{4n-a} + \sqrt{b+r n} \Rightarrow D_f = \{r\} \Rightarrow \begin{cases} 4(r)-a=0 \Rightarrow r=a \\ b-r(r)=0 \Rightarrow b=r^2 \end{cases} \Rightarrow \frac{b}{a} = \frac{r^2}{r} = r$

7

الف) $y = \frac{x^2 - x - 4}{x^2 - 13x + 44} \Rightarrow (x-4)(x+11) \Rightarrow x=4$
 $x=-11$
 $t = \frac{x}{4} \Rightarrow t^2 - 13t + 11 = (t-4)(t-11) \Rightarrow t=4 \Rightarrow x=16$
 $t=11 \Rightarrow x=44$
 $\Rightarrow (-\infty, -11) \cup (4, 16) \cup (44, +\infty)$

8

الف) $y = \frac{2x^3 - 2x^2 - 2x + 4}{2x^3 + 2x^2 - 2x - 4} \Rightarrow \frac{(2x-1)(x-2)(x+2)}{(x+1)(x+2)(x-2)} \Rightarrow \frac{2x-1}{x+1}$
 $\Rightarrow (-\infty, -1) \cup [2, +\infty)$

ارائه سوال 8

9

الف) $y = \sqrt{r[n] - \varepsilon} \Rightarrow r[n] \geq \varepsilon \Rightarrow [n] \geq \frac{\varepsilon}{r} \Rightarrow [\frac{\varepsilon}{r}, +\infty)$
 ب) $y = \sqrt{r[n] - \varepsilon} \Rightarrow r[n] \geq \varepsilon \Rightarrow [n] \geq \frac{\varepsilon}{r} \Rightarrow \frac{\varepsilon}{r} \leq [n] \Rightarrow [n] \in [\frac{\varepsilon}{r}, +\infty)$

الف) $y = \sqrt{\frac{x+1}{|x-1|}} + \sqrt{\frac{4-x}{2x^2 + 2x + \varepsilon}} \Rightarrow x \geq -1$
 $x \neq 1$
 $\Delta < 0$
 $\Rightarrow [-1, 1) \cup (2, 4]$
 $\hookrightarrow [-1, 4] - \{1\}$

10

ب) $y = \sqrt{[n] - \varepsilon} + \sqrt{r - [n]} \Rightarrow [n] \geq \varepsilon$
 $[n] \leq r$
 $\Rightarrow [n] \in [\varepsilon, r]$