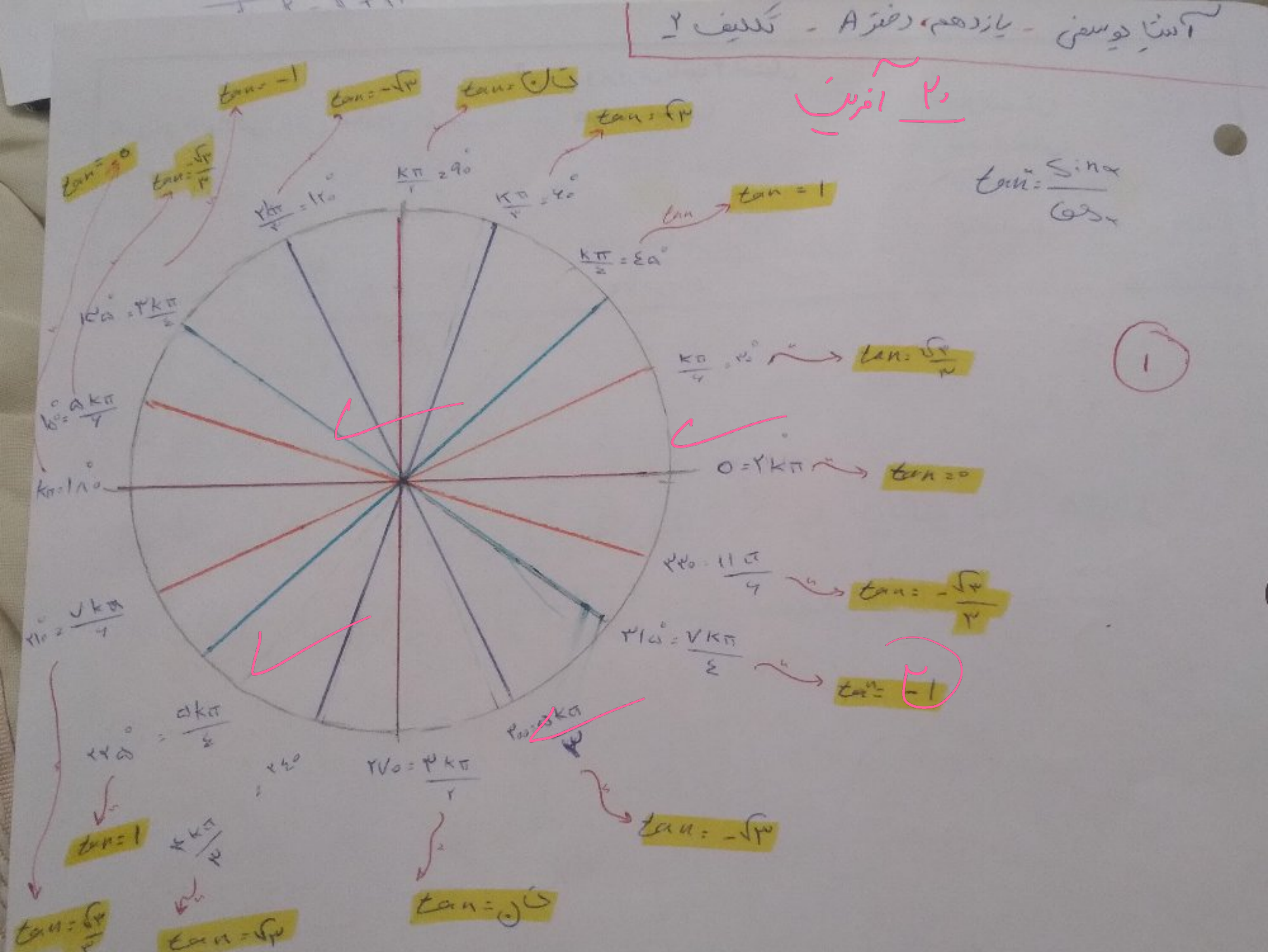




الف) $\frac{\sin \frac{\pi}{4}}{4} + \cos \frac{\pi}{4} + r \tan \frac{\pi}{4} = \frac{1}{4} - 1 + 1(-1) \Rightarrow \frac{1}{4} - 1 - 1 = -\frac{7}{4}$

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

ج) $\cos \frac{\pi}{4} + \cos \frac{\pi}{4} - r \tan \frac{\pi}{4} = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 1(-1) = \sqrt{2} + 1$

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

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

$a^2 + \varepsilon a = r a + a + r$

$a^2 + a - r = 0$

$(a+r)(a-r) = 0$

$a+r = 0 \Rightarrow a = -r$

$a-r = 0 \Rightarrow a = r$

$f(1) = 1^2 + \varepsilon = 1 + \varepsilon$

$f(1) = r(1) + a + r = r + a + r = 2r + a$

$1 + \varepsilon = 2r + a$

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

$n+1 \geq r \Rightarrow n \geq r-1$

$n+1 \leq -r \Rightarrow n \leq -r-1$

$r(-r)^2 - b = a + r(-r)$

$1r + 4 = a + b$

$r \varepsilon \geq a + b$

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

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ب) $\frac{1}{y} = \frac{1}{r n^2 + \varepsilon n^2 + a + \varepsilon}$

$r n^2 + \varepsilon n^2 + a + \varepsilon \neq 0$

$(n+r)(r n^2 + \varepsilon n^2 + a + \varepsilon) \neq 0$

$(n+r)(r n^2 + \varepsilon n^2 + a + \varepsilon) \neq 0$

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الف) $y = \sqrt{n^2 - 1} + \sqrt{n - r} \Rightarrow n^2 - 1 \geq 0 \Rightarrow n^2 \geq 1 \Rightarrow n \geq 1 \text{ or } n \leq -1$

$n - r \geq 0 \Rightarrow n \geq r$

$n \geq r \Rightarrow n \geq r \Rightarrow [r, +\infty)$

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ب) $y = \frac{\sqrt{4-rn}}{\sqrt{4n-r}}$

$4-rn \geq 0 \Rightarrow n \leq \frac{4}{r}$

$4n-r \geq 0 \Rightarrow n \geq \frac{r}{4}$

$n \in [\frac{r}{4}, \frac{4}{r}]$

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$y = \sqrt{4n-a} + \sqrt{b+r n} \Rightarrow D_f = \{r\}$

$4(r)-a=0 \Rightarrow 4r=a$

$b-r(r)=0 \Rightarrow b=r^2$

$\frac{b}{a} = \frac{r^2}{4r} = \frac{r}{4}$

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الف) $y = \frac{x^2 - x - 4}{x^2 - 13x + 44}$

$(x-4)(x+11) \Rightarrow x=4 \text{ or } x=-11$

$x^2 - 13x + 44 = (x-4)(x-11)$

$t = x \Rightarrow t^2 - 13t + 44 = (t-4)(t-11)$

$t=4 \Rightarrow x=4$

$t=11 \Rightarrow x=11$

$x \in (-\infty, -11) \cup (-11, 4) \cup (4, +\infty)$

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ب) $y = \sqrt{2n-1} + \sqrt{4-n} \Rightarrow 2n-1 \geq 0 \Rightarrow n \geq \frac{1}{2}$

$4-n \geq 0 \Rightarrow n \leq 4$

$n \in [\frac{1}{2}, 4]$

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الف) $y = \sqrt{\frac{n+1}{n-1}} + \sqrt{\frac{4-n}{n^2 + \varepsilon n^2 + a + \varepsilon}}$

$n \geq 1$

$4-n \geq 0 \Rightarrow n \leq 4$

$n \in [1, 4]$

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ب) $y = \sqrt{[n] - \varepsilon} + \sqrt{r - [n]}$

$[n] \geq \varepsilon$

$r - [n] \geq 0 \Rightarrow [n] \leq r$

$[n] \in [\varepsilon, r]$

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