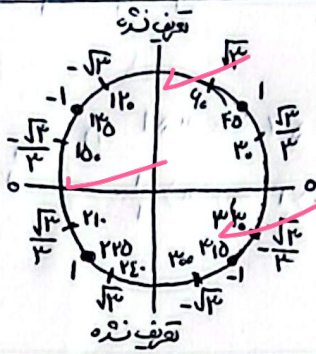


$\tan \Rightarrow$ زوا



$$\sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{3\pi}{4} = \frac{1}{2} - 1 - 2 = -\frac{1}{2}$$

$$-\cos \frac{\Delta \pi}{9} + \sin \frac{2\pi}{3} - 3 \sin \frac{4\pi}{3} = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} + \frac{3\sqrt{3}}{2} = \frac{5\sqrt{3}}{2}$$

$$\cot \frac{2\pi}{3} + 3 \cot \frac{4\pi}{3} - 2 \tan \frac{\Delta \pi}{9} = -\frac{\sqrt{3}}{2} + \frac{3\sqrt{3}}{2} + \frac{2\sqrt{3}}{2} = \frac{4\sqrt{3}}{2}$$

$$\cos(\sin \pi) + \sin(\pi \cos \frac{\pi}{2}) = 1 + 1 = 2$$

$$f(x) = \begin{cases} x^2 + \varepsilon x & x \geq a \\ 2x + a + 2 & x \leq a \end{cases} \Rightarrow a^2 + \varepsilon a = 2a + a + 2 \Rightarrow a^2 + a - 2 = 0 \Rightarrow \Delta = 1 + 8 = 9$$

$$\frac{-1 \pm \sqrt{9}}{2} = \frac{-1 \pm 3}{2} \Rightarrow \frac{-1 + 3}{2} = 1 \quad \frac{-1 - 3}{2} = -2$$

$$f(1) = (1)^2 + 2(1) = 5$$

$$f(x) = \begin{cases} 2x^2 - b & |x+1| \geq 2 \\ 2x + a & -3 \leq x \leq -1 \end{cases} \Rightarrow x = -3 \Rightarrow a + 2x = 2x^2 - b \Rightarrow$$

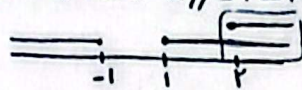
$$a - 9 = 18 - b \Rightarrow a + b = 27$$

$$\frac{1}{2x^2 + 4x^2 + 2x + 8} = \frac{1}{2x(x^2 + 2x + 1) + 8} \Rightarrow 2x(x+1)^2 \neq -8 \Rightarrow x \neq -2 \text{ (مخرج صفر نشود)}$$

$$D_f = \mathbb{R} - \{-2\}$$

$$\frac{1}{x^2 - \varepsilon x^2} \neq 0 \quad x^2(x - \varepsilon) \neq 0 \quad \text{ب} \quad 2x - 2(-2+1)^2 = -2(-1)^2 = -2 \neq 0$$

$$\mathbb{R} - \{0, -2\}$$

$y = \sqrt{x^2-1} + \sqrt{x-2} \Rightarrow x^2-1 \geq 0 \Rightarrow x^2 \geq 1 \Rightarrow x \geq \pm 1 \Rightarrow (-\infty, -1] \cup [1, +\infty)$ $x-2 \geq 0 \Rightarrow x \geq 2 \Rightarrow [2, +\infty)$  $[2, +\infty)$	6
$y = \frac{\sqrt{4-x}}{\sqrt{9x-2}} \Rightarrow \begin{aligned} 4-x &\geq 0 \Rightarrow x \leq 4 \\ 9x-2 &\geq 0 \Rightarrow x > \frac{2}{9} \end{aligned} \Rightarrow \left(\frac{2}{9}, 4 \right]$	7
ف) نویسی بهتره ن $y = \sqrt{4x-a} + \sqrt{b-3x}$ $D = \{x\} \Rightarrow \begin{aligned} 4x-a &= 0 \Rightarrow a = 12 \\ b-9 &= 0 \Rightarrow b = 9 \end{aligned} \quad \frac{b}{a} = \frac{9}{12} = \frac{3}{4}$	8
$y = \sqrt{\frac{x^2-x-9}{x^2-13x^2+34}} \Rightarrow \begin{aligned} x^2-x-9 &\rightarrow \Delta = 1+36=37 \rightarrow \frac{1 \pm \sqrt{37}}{2} = x_1, x_2 \\ x^2-13x^2+34 &= (x^2-4)(x^2-9) = (x-2)(x+2)(x-3)(x+3) \end{aligned}$ مضاعف $\frac{-3 \quad -2 \quad 2 \quad 3}{+ \quad - \quad - \quad +} \Rightarrow (-\infty, -3) \cup (-2, 2) \cup (3, +\infty)$	9
$y = \sqrt{2[x]-4} \Rightarrow 2[x]-4 \geq 0 \Rightarrow 2[x] \geq 4 \Rightarrow [x] \geq 2 \Rightarrow [2, +\infty)$ $y = \sqrt{2[x]-5} \Rightarrow 2[x]-5 \geq 0 \Rightarrow 2[x] \geq 5 \Rightarrow [x] \geq \frac{5}{2} \Rightarrow [3, +\infty)$	10

۳- $x = a$ در هر دو ضابطه مشترک است پس باید صدق آنها نیز با هم برابر باشد

$$a^2 + 4(a) = 2(a) + a + 2 \leadsto a^2 + 2a = 3a + 2 \leadsto$$

$$a^2 + a - 2 = 0 \rightarrow (a+2)(a-1) = 0 \xrightarrow{a > 0} a = 1$$

$$\leadsto \phi(n) = \begin{cases} n^2 + 4n & n \geq 1 \\ 2n + 3 & n \leq 1 \end{cases} \leadsto \boxed{\phi(1) = 5}$$