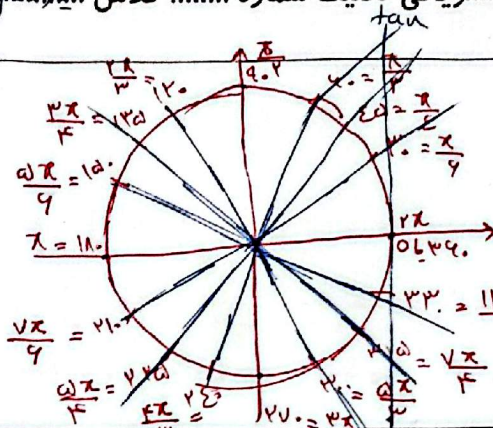




$$\begin{aligned} \tan x &= 0 & \tan \pi &= 0 \\ \tan \frac{\pi}{6} &= \frac{1}{\sqrt{3}} & \tan \frac{5\pi}{6} &= \frac{1}{\sqrt{3}} \\ \tan \frac{\pi}{4} &= 1 & \tan \frac{3\pi}{4} &= 1 \\ \tan \frac{\pi}{3} &= \sqrt{3} & \tan \frac{2\pi}{3} &= \sqrt{3} \\ \tan \frac{2\pi}{3} &= \sqrt{3} & \tan \frac{4\pi}{3} &= -\sqrt{3} \\ \tan \frac{3\pi}{4} &= 1 & \tan \frac{5\pi}{4} &= 1 \\ \tan \frac{5\pi}{6} &= \frac{1}{\sqrt{3}} & \tan \frac{7\pi}{6} &= \frac{1}{\sqrt{3}} \\ \tan \frac{7\pi}{6} &= \frac{1}{\sqrt{3}} & \tan \frac{5\pi}{4} &= -1 \\ \tan \frac{5\pi}{4} &= -1 & \tan \frac{3\pi}{2} &= -\frac{\sqrt{3}}{3} \\ \tan \frac{3\pi}{2} &= -\frac{\sqrt{3}}{3} & \tan \frac{11\pi}{6} &= -\frac{\sqrt{3}}{3} \end{aligned}$$

الف $\rightarrow \sin \frac{\pi}{6} + \cos \frac{\pi}{4} + 2 \tan \frac{\pi}{3} = \frac{1}{2} + \frac{\sqrt{2}}{2} + 2(\sqrt{3}) = \frac{1}{2} + \frac{\sqrt{2}}{2} + 2\sqrt{3}$

ب $\rightarrow -\cos \frac{\omega\pi}{6} + \sin \frac{\nu\pi}{4} - 3 \sin \frac{\pi}{3} = -\cos \frac{10\pi}{6} + \sin \frac{4\pi}{4} - 3 \sin \frac{\pi}{3} = -\cos \frac{5\pi}{3} + \sin \pi - 3 \sin \frac{\pi}{3} = -1 + 0 - 3 \cdot \frac{\sqrt{3}}{2} = -1 - \frac{3\sqrt{3}}{2}$

ج $\rightarrow \cos(\sin x) + \sin(x \cos \frac{\pi}{6}) = \cos(\sin \frac{\pi}{6}) + \sin(\frac{\pi}{6} \cos \frac{\pi}{6}) = \cos(\frac{1}{2}) + \sin(\frac{\pi}{12}) = \cos(30^\circ) + \sin(15^\circ) = \frac{\sqrt{3}}{2} + \frac{\sqrt{2}-1}{2} = \frac{\sqrt{3} + \sqrt{2} - 1}{2}$

$x=a \rightarrow a^r + \varepsilon a = \varepsilon a + a + r$
 $a^r + \varepsilon a = \varepsilon a + r$
 $a^r + a \varepsilon r = 0$
 $(a+r)(a-\varepsilon) = 0$
 $a = -r$
 $a = +\varepsilon$

$f(n) = \begin{cases} n^r + \varepsilon n & n \geq 1 \\ \varepsilon n + \varepsilon^2 & n \leq 1 \end{cases}$
 $f(1) = 1^r + \varepsilon(1) = \varepsilon$
 جواب

$|n+1| \geq 2 \rightarrow n+1 \geq 2 \rightarrow n \geq 1$
 $n+1 \leq -2 \rightarrow n \leq -3$

$n = -3 \rightarrow 1n - b = a - \varepsilon$
 $\varepsilon - b = a$
 $a + b \rightarrow \varepsilon - b + b = \varepsilon$
 جواب

الف $\rightarrow y = \frac{1}{n^r - \varepsilon n^r} = \frac{1}{n^r(n - \varepsilon)}$
 $n = \varepsilon$

ب $\rightarrow y = \frac{1}{\varepsilon n^r + \varepsilon n^r + \varepsilon n + \varepsilon} = \frac{1}{\varepsilon n^r(n + \varepsilon) + (\varepsilon n + \varepsilon)} = \frac{1}{\varepsilon(n + \varepsilon)(n^r + 1)}$
 $n = -\varepsilon$

$D_f = R - \{\varepsilon, 0\}$
 $D_f = R - \{-r\}$

الف $\rightarrow \begin{cases} n^2 - 1 \geq 0 \\ n^2 \geq 1 \end{cases} \rightarrow \begin{cases} n \geq 1 \\ n \leq -1 \end{cases} \rightarrow \text{استنتاج} \rightarrow D_f = [1, +\infty)$

$n - 2 \geq 0 \rightarrow n \geq 2$

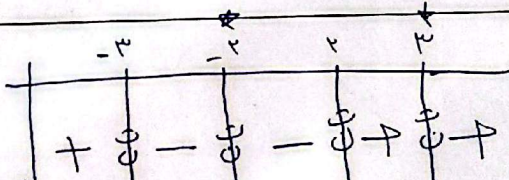
ب $\rightarrow \begin{cases} 4 - 3n \geq 0 \\ 4 \geq 3n \end{cases} \rightarrow \begin{cases} n \leq \frac{4}{3} \end{cases} \rightarrow \text{استنتاج} \rightarrow D_f = (\frac{1}{2}, 2]$

$4n - a \geq 0 \rightarrow 4n \geq a \rightarrow n \geq \frac{a}{4}$
 $b - 3n \geq 0 \rightarrow b \geq 3n \rightarrow \frac{b}{3} \geq n$
 $\frac{b}{3} = 2 \rightarrow b = 6$

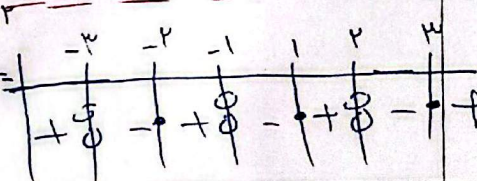
$\frac{b}{a} = \frac{4}{12} = \frac{1}{3}$

$\frac{a}{4} = 2 \rightarrow a = 12$

الف $= y = \sqrt{\frac{(n-3)(n+3)}{(n^2-2)(n^2-9)}}$
 $D_f = (-\infty, 3) \cup (3, 3) \cup (3, +\infty)$



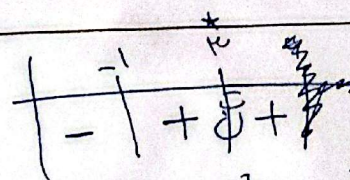
ب $= y = \sqrt{\frac{(n-1)(n-3)(n+3)}{(n-2)(n+1)(n+3)}}$
 $D_f = \mathbb{R} \setminus (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [3, +\infty)$



الف $\rightarrow 2[n] - \varepsilon \geq 0 \rightarrow 2[n] \geq \varepsilon$
 $[n] \geq 2 \rightarrow D_f = [2, +\infty)$

ب $\rightarrow 2[n] - \omega \geq 0 \rightarrow 2[n] \geq \omega$
 $[n] \geq \frac{\omega}{2} \rightarrow D_f = [\frac{\omega}{2}, +\infty)$

الف $\rightarrow y = \sqrt{\frac{(n+1)}{(n-3)}} + \sqrt{\frac{(4-n)}{(n+2)}}$



ب $\rightarrow [n] - \varepsilon \geq 0 \rightarrow [n] \geq \varepsilon \rightarrow D_f = [\varepsilon, +\infty)$
 $2[n] \geq 0 \rightarrow [n] \geq 0 \rightarrow D_f = \emptyset$