

الف)  $\frac{D}{1\lambda_0} = \frac{R\alpha d}{\pi} \Rightarrow \frac{rV}{1\lambda_0} = \frac{rad}{\pi} \Rightarrow \boxed{\frac{3\pi}{2}} rad$   $\left\{ \begin{array}{l} \text{ب) } \frac{D}{1\lambda_0} = \frac{\omega \times 1\lambda_0}{2\pi} \Rightarrow D = \frac{\omega \times 1\lambda_0}{2\pi} = 7\omega \\ \text{ج) } \frac{D}{1\lambda_0} = \frac{\omega \times 1\lambda_0}{2\pi} \Rightarrow D = \frac{\omega \times 1\lambda_0}{2\pi} = 1\lambda_0 \end{array} \right.$

$\left( \frac{12\omega\alpha}{9} \right) = \frac{D}{1\lambda_0} \Rightarrow \frac{12\omega\alpha}{1\lambda_0} = \frac{D}{1\lambda_0} \Rightarrow D = \frac{12\omega\alpha \times 1\lambda_0}{1\lambda_0} = 12\omega\alpha$

$\left( \frac{\alpha\pi}{\lambda} \right) = \frac{D}{1\lambda_0} \Rightarrow D = \frac{\alpha \times 1\lambda_0}{\pi} = \frac{12\omega\alpha}{\pi}$

$\Rightarrow 12\omega\alpha + 12\omega\alpha + 1\omega\alpha = 1\lambda_0 \Rightarrow \alpha(12\omega + 12\omega + 1\omega) = 1\lambda_0$

$\Rightarrow \alpha = \frac{1\lambda_0}{25} = 4^\circ$

الف)  $\cos 3^\circ \cdot \cos 3^\circ - \sin 3^\circ \cdot \sin 3^\circ - \tan 6^\circ + \cot 6^\circ = 0 + \cot 6^\circ = 1$

$\sin 3^\circ = \cos 6^\circ, \sin 6^\circ = \cos 3^\circ \Rightarrow \cot 6^\circ = \tan 3^\circ \Rightarrow -\tan 6^\circ + \cot 6^\circ = \cot 6^\circ$

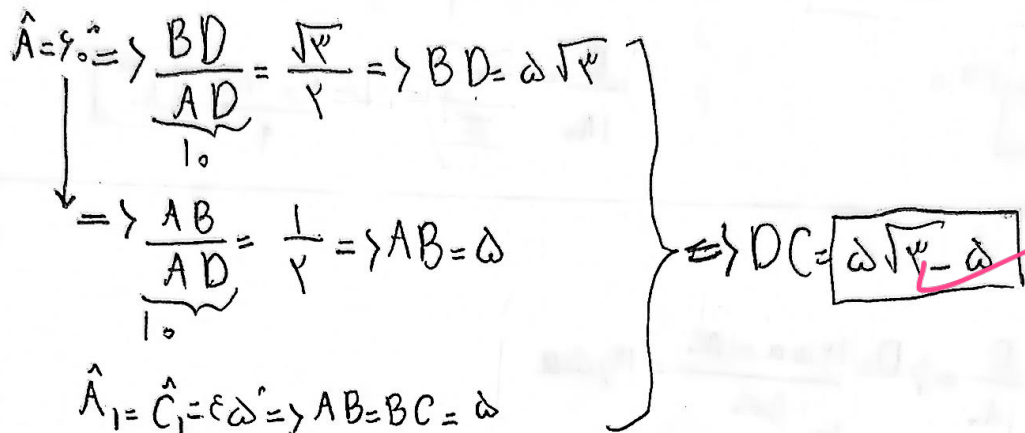
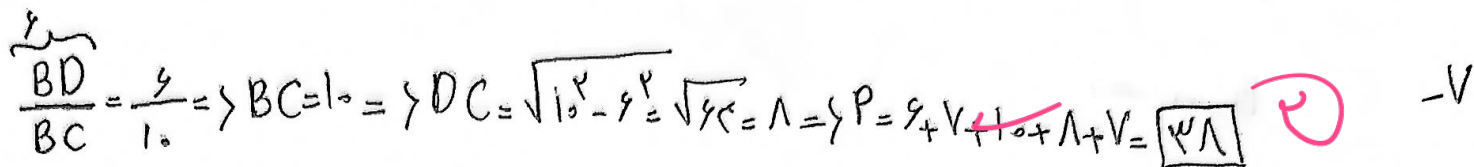
ب)  $\frac{\tan 3^\circ + \tan 6^\circ + \tan 9^\circ}{\cot 3^\circ - \cot 6^\circ} = \frac{\left(\frac{1}{\sqrt{3}}\right) + 1 + (\sqrt{3})}{(\sqrt{3}) - \left(\frac{1}{\sqrt{3}}\right)} = \frac{\frac{1\sqrt{3} + \sqrt{3} + 3}{\sqrt{3}}}{\frac{3 - 1}{\sqrt{3}}} = \frac{1\sqrt{3} + \sqrt{3} + 3}{2} = \frac{1\sqrt{3} + \sqrt{3}}{2} = \frac{1\sqrt{3}}{2}$

$-\sin 3^\circ \cos 6^\circ + \cos 3^\circ \sin 6^\circ = \sin \theta \Rightarrow -\sin 3^\circ + \cos 3^\circ = -\left(\frac{1}{\sqrt{3}}\right) + \left(\frac{\sqrt{3}}{2}\right) = \frac{1}{2} \Rightarrow \sin \theta = \pm \frac{\sqrt{2}}{2} \Rightarrow \theta = 45^\circ$

$\theta = 6^\circ \Rightarrow \tan 6^\circ = \frac{\sin 6^\circ}{\cos 6^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{\sqrt{3}}} = 1$

$\frac{1 \tan 3^\circ (1 - \tan 3^\circ)}{(1 - \cot 3^\circ)^2} = \tan \theta \Rightarrow \frac{1 \left(\frac{1}{\sqrt{3}}\right) \left(1 - \left(\frac{1}{\sqrt{3}}\right)\right)}{\left(1 - \left(\frac{1}{\sqrt{3}}\right)\right)^2} = \tan \theta \Rightarrow \theta = 3^\circ$

$\tan \theta = \omega \Rightarrow \frac{\sin \theta}{\cos \theta} = \omega \Rightarrow \sin \theta = \omega \cos \theta \Rightarrow \frac{1 \sin \theta - \cos \theta}{\sin \theta - \cos \theta} = \frac{1 \cos \theta - \cos \theta}{1 \cos \theta} = 1$


$$\tan x = \frac{\sin x}{\cos x} = \frac{1}{r} \Rightarrow \cos x = r \sin x, \underbrace{\sin x < 0, \cos x < 0}_{\text{quadrant}}$$

$$\sin^2 x + \cos^2 x = 1 \Rightarrow \sin^2 x + 9 \sin^2 x = 1 \Rightarrow \sin^2 x = \frac{1}{10} \Rightarrow \sin x = \pm \frac{1}{\sqrt{10}}$$

چون  $\sin x$  نامنفی است