

الف) $\frac{rV}{1\lambda_0} = \frac{Rad}{\pi} \rightarrow Rad = \frac{rV\pi}{1\lambda_0} = \frac{10}{100} \pi = \frac{\pi}{10} rad$

ب) $\frac{10}{1\lambda_0} = \frac{Rad}{\pi} \rightarrow Rad = \frac{10\pi}{1\lambda_0} = \frac{10\pi}{100} rad$

ج) $\frac{a\pi rad}{\pi} = \frac{D}{1\lambda_0} \rightarrow D = \frac{a\pi \times 1\lambda_0}{\pi} = 100^\circ$

د) $\frac{5\pi rad}{\pi} = \frac{D}{1\lambda_0} \rightarrow D = \frac{5\pi \times 1\lambda_0}{\pi} = 100^\circ$

$\frac{D}{1\lambda_0} = \frac{rad}{\pi} = \frac{G}{100} \rightarrow \begin{cases} \frac{120a}{100} = \frac{D}{1\lambda_0} \rightarrow D = \frac{120a \times 1\lambda_0}{100} = (12/10a)^\circ \\ \frac{a\pi}{\pi} = \frac{D}{1\lambda_0} \rightarrow \frac{a\pi \times 1\lambda_0}{\pi} = (12/10a)^\circ \end{cases}$

$100^\circ \rightarrow 120a + 120a + 10a = 10a \pi$

$\rightarrow 10a = 100^\circ \rightarrow a = 10^\circ$

الف) $(\frac{1}{2} \times \frac{\sqrt{3}}{2}) - (\frac{\sqrt{3}}{2} \times \frac{1}{2}) - 1 + 1 = 1$

ب) $\frac{(\frac{\sqrt{3}}{2})^2 + 1^2 + (\frac{\sqrt{3}}{2})^2}{\sqrt{3} - \frac{\sqrt{3}}{2}} = \frac{\frac{3}{4} + 1 + \frac{3}{4}}{\frac{2\sqrt{3} - \sqrt{3}}{2}} = \frac{\frac{5}{2}}{\frac{\sqrt{3}}{2}} = \frac{5}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$

$-\frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \sin\theta \rightarrow \sin\theta = -\frac{1}{4} + \frac{3}{4} = \frac{1}{2} \rightarrow \frac{1}{2} + \cos\theta = 1 \rightarrow \cos\theta = \frac{1}{2}$

$\rightarrow \begin{cases} \sin\theta = \frac{1}{2} \rightarrow \sin\theta = \frac{\sqrt{3}}{2} \\ \cos\theta = \frac{1}{2} \rightarrow \cos\theta = \frac{\sqrt{3}}{2} \end{cases} \rightarrow \tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}} = 1$

$\tan 60^\circ = 1$

$\frac{1 \times \frac{\sqrt{3}}{2} (1 - (\frac{\sqrt{3}}{2})^2)}{(1 - (\frac{\sqrt{3}}{2})^2)^2} = \frac{\frac{\sqrt{3}}{2} (1 - \frac{3}{4})}{(1 - \frac{3}{4})^2} = \frac{\frac{\sqrt{3}}{2} \times \frac{1}{4}}{(\frac{1}{4})^2} = \frac{\frac{\sqrt{3}}{8}}{\frac{1}{16}} = \frac{\sqrt{3}}{8} \times \frac{16}{1} = 2\sqrt{3}$

$\tan\theta = 2\sqrt{3} \rightarrow \theta = 60^\circ \rightarrow \theta = \frac{\pi}{3}$

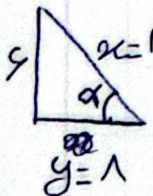
$$\frac{\sin \theta}{\cos \theta} = \omega \rightarrow \sin \theta = \omega \cos \theta \rightarrow \sin^2 \theta + \cos^2 \theta = 1 \rightarrow \omega^2 \cos^2 \theta + \cos^2 \theta = 1$$

$$\rightarrow \cos^2 \theta = \frac{1}{1 + \omega^2} \rightarrow \cos \theta = \frac{1}{\sqrt{1 + \omega^2}} \rightarrow \sin \theta = \frac{\omega}{\sqrt{1 + \omega^2}} = \frac{\omega \sqrt{19}}{20}$$

$$\cos \theta = \frac{1}{\sqrt{19}} \times \frac{\sqrt{19}}{\sqrt{19}} = \frac{\sqrt{19}}{20}$$

$$\frac{10 \sqrt{19}}{20} - \frac{\sqrt{19}}{20} = \frac{19 \sqrt{19}}{20} \times \frac{19}{\sqrt{19}} = 19$$

(۲) ✓



$\alpha = 10$ $\sin \alpha = \frac{y}{10} = \frac{y}{20} \rightarrow \alpha = 10$

$x^2 + y^2 = 10^2 \rightarrow y^2 = 49 \rightarrow y = 7$

مساحت ذوزنقه = $4 + 7 + 10 + 7 + 7 = 35$

(۲) ✓

$D = 30^\circ \rightarrow \sin 30^\circ = \frac{1}{2} = \frac{AB}{10} \rightarrow AB = 5$ $AB + BD = 10 \rightarrow 5 + BD = 10$

$\rightarrow BD = 5 \rightarrow BD = \sqrt{3} \times 5 = 5\sqrt{3}$

$\tan 60^\circ = 1 \rightarrow \frac{BC}{AB} = 1 \rightarrow BC = AB = 5$

$BD = BC + DC \rightarrow 5\sqrt{3} = 5 + DC \rightarrow DC = 5\sqrt{3} - 5$

(۲) ✓

نسبت دوم و سوم $\rightarrow$ کاسه شش (الف)
نسبت دوم و چهارم $\rightarrow$ کاسه شش (ب)

نسبت اول و دوم $\rightarrow$ کاسه شش (الف)
نسبت اول و چهارم $\rightarrow$ کاسه شش (ب)

نسبت اول و دوم $\rightarrow$ کاسه شش (الف)
نسبت اول و چهارم $\rightarrow$ کاسه شش (ب)

(۲) ✓

$\frac{\sin x}{\cos x} = \frac{1}{3} \rightarrow \sin x = \frac{1}{3} \cos x$ $\sin^2 x + \cos^2 x = 1$

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

$\rightarrow \sin x = \frac{1}{\sqrt{10}} \times \frac{\sqrt{10}}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

$\rightarrow \sin x = -\frac{\sqrt{10}}{10}$

(۲) ✓