

الف) $180^\circ = (\pi) \text{ rad}$ $\frac{180^\circ}{\pi} = \frac{\text{Rad}}{\pi} \rightarrow 180 \text{ Rad} = \pi \rightarrow \text{Rad} = \frac{\pi}{180}$

ب) $15^\circ = (\pi) \text{ Rad}$ $\frac{15^\circ}{\pi} = \frac{\text{Rad}}{\pi} \rightarrow \text{Rad} = \frac{15}{180} \pi$

ج) $\frac{5}{12} \pi \text{ Rad} = (\pi)^\circ$ $\frac{5}{12} \pi = \frac{D}{180} \rightarrow D = 75^\circ$

د) $\frac{5}{9} \pi \text{ rad} = (\pi)^\circ$ $\frac{5}{9} \pi = \frac{D}{180} \rightarrow D = 100^\circ$

$\frac{15a}{9} = \frac{D}{180} \rightarrow 1500a = 900D \rightarrow \frac{15}{9}a = D$ / $\frac{a}{\pi} = \frac{D}{180} \rightarrow \frac{15a}{\pi} = D$

$\frac{15}{9}a + \frac{15}{9}a + \frac{15}{9}a = 90^\circ a = 150^\circ a = 180^\circ \rightarrow a = \frac{180}{150} \Rightarrow 120^\circ = a$

الف) $\cos 45^\circ \cos 45^\circ - \sin 45^\circ \sin 45^\circ - \tan 45^\circ + \cot 45^\circ = 1$

ب) $\frac{\tan 45^\circ + \tan 45^\circ + \tan 45^\circ}{\frac{1}{\sqrt{3}}} = \frac{1 + 1 + 1}{\frac{1}{\sqrt{3}}} = \frac{3}{\frac{1}{\sqrt{3}}} = 3\sqrt{3}$

$-\sin 45^\circ \cos 45^\circ + \cos 45^\circ \sin 45^\circ = \sin \theta$
 $-\frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} = \frac{1}{2} - \frac{1}{2} = 0 \rightarrow \sin \theta = 0 \rightarrow \theta = 0^\circ$

$\theta = 0^\circ, 180^\circ, 360^\circ, \dots$

$\frac{1 \tan 45^\circ (1 - \tan 45^\circ)}{(1 - \cot 45^\circ)^2} = \frac{1 \tan 45^\circ}{1 - \cot 45^\circ} = \frac{1 \cdot 1}{1 - 1} = \frac{1}{0} = \text{undefined}$

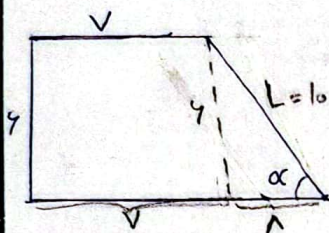
$\frac{1}{\pi} = \frac{\text{Rad}}{\pi} \rightarrow \frac{\pi}{1} = \text{Rad}$

$$\tan \theta = \omega$$

$$\frac{(3 \sin \theta - \cos \theta) \div \cos \theta}{(\sin \theta - 4 \cos \theta) \div \cos \theta} = \frac{\frac{3 \sin \theta}{\cos \theta} - 1}{\frac{\sin \theta}{\cos \theta} - 4} = \frac{3 \tan \theta - 1}{\tan \theta - 4} = \frac{1 \times 1}{1} = \boxed{11^c}$$

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$$\sin \alpha = \frac{4}{10}$$

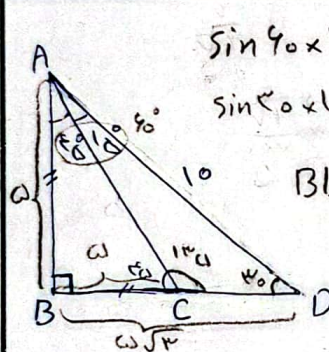


$$\sin \alpha \times 10 = 4$$

$$10^2 - 4^2 = 8^2$$

$$4 + 3 + 10 + 10 = \boxed{27}$$

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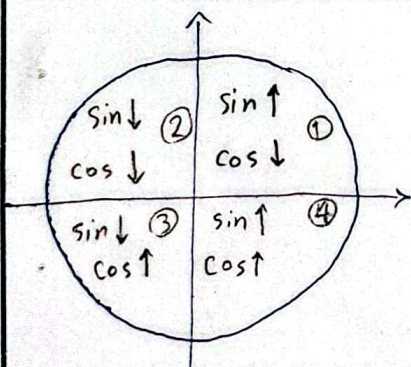


$$\sin 45^\circ \times 10 \rightarrow \frac{\sqrt{2}}{2} \times 10 = \omega \sqrt{3} = BD$$

$$\sin 45^\circ \times 10 \rightarrow \frac{1}{\sqrt{2}} \times 10 = \omega = AB = BC$$

$$BD - BC = \omega \sqrt{3} - \omega = \boxed{\omega(\sqrt{3} - 1) = CD}$$

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الف $\uparrow \cos \theta, \downarrow \sin \theta : \uparrow \theta$

ب $\downarrow \cos \theta, \downarrow \sin \theta : \uparrow \theta$

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$$\tan x = \frac{\sin x}{\cos x} = \frac{1}{\sqrt{3}} \rightarrow \sin x = \cos x \rightarrow \sin x = \frac{1}{\sqrt{3}} \cos x$$

$$\sin^2 x + \cos^2 x = 1 / \left(\frac{1}{\sqrt{3}} \cos x \right)^2 + \cos^2 x = \frac{1}{9} \cos^2 x + \cos^2 x = \frac{10}{9} \cos^2 x = 1$$

$$\cos^2 x = \frac{9}{10} \rightarrow \cos x = \pm \frac{3}{\sqrt{10}}$$

$$\sin x = \frac{1}{\sqrt{3}} \cos x \Rightarrow \frac{1}{\sqrt{3}} \times \left(-\frac{3}{\sqrt{10}} \right) = -\frac{1}{\sqrt{10}} = \boxed{-\frac{\sqrt{10}}{10}}$$

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