

$$\frac{12\pi}{180} = \frac{2\pi}{90}$$

(ب)

$$\text{rad} = \text{degree} \times \frac{\pi}{180} = \frac{2\pi}{90} = \frac{2\pi}{90} \quad (\text{الف})$$

$$\frac{\pi}{9} \times \frac{180}{\pi} = 180^\circ \quad \checkmark$$

$$\text{degree} = \text{rad} \times \frac{180}{\pi} = \frac{\pi}{12} \times \frac{180}{\pi} = 15^\circ \quad \checkmark \quad (\text{ج})$$

$$\text{degree} = \text{rad} \times \frac{180}{\pi} = \frac{a\pi}{1} \times \frac{180}{\pi} = 180a$$

$$\frac{2a}{2} + \frac{4a}{2} + 10a = 180$$

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$$\text{degree} = \text{grad} \times \frac{9}{10} = \frac{18a}{9} \times \frac{9}{10} = \frac{2a}{10}$$

$$\frac{2a}{2} + \frac{4a}{2} + 10a = 180$$

$$\frac{90a}{2} = 180 \quad 180a = 180 \quad \boxed{a=1} \quad \checkmark$$

$$\tan 30^\circ = \left(\frac{\sqrt{3}}{3}\right)^2 = \frac{1}{3} \quad \text{Cot } 30^\circ = \sqrt{3}$$

$$\tan 45^\circ = 1$$

$$\text{Cot } 45^\circ = \frac{\sqrt{3}}{3}$$

$$\tan 60^\circ = (\sqrt{3})^2 = 3$$

$$\frac{\frac{1}{3} + 1}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{\frac{4}{3}}{\frac{3\sqrt{3} - \sqrt{3}}{3}} = \frac{4}{2\sqrt{3}} = \frac{2}{\sqrt{3}}$$

$$= \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3} = \boxed{\frac{2\sqrt{3}}{3}} \quad \checkmark$$

$$\cos 45^\circ = \sin 30^\circ / \tan 45^\circ = 1 \quad (\text{الف})$$

$$\sin 45^\circ = \cos 30^\circ / \text{Cot } 45^\circ = 1$$

$$\cos 45^\circ \cos 30^\circ - \cos 30^\circ \cos 45^\circ = 0$$

$$-1 + 1 = 0 \quad \checkmark$$

$$\sin 30^\circ = \cos 45^\circ = \frac{1}{2}$$

$$-\frac{1}{2} + \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}\right) = -\frac{1}{2} + \frac{3}{4} = \frac{1}{4} = \frac{1}{2}$$

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$$\frac{1}{2} = \sin \theta \Rightarrow \sin \theta = \frac{1}{2} = \frac{\sqrt{3}}{2} \rightarrow \theta = 30^\circ / \theta = 150^\circ \rightarrow \text{وحد} \Rightarrow \theta = 30^\circ$$

$$\boxed{\tan 45^\circ = 1} \quad \checkmark$$

$$1 - \tan 30^\circ = 1 - \frac{\sqrt{3}}{3}$$

$$1 - \tan 30^\circ = 1 - \left(\frac{\sqrt{3}}{3}\right)^2 = 1 - \frac{1}{3} = \frac{2}{3}$$

$$1 - \text{Cot } 45^\circ = 1 - \left(\frac{\sqrt{3}}{3}\right)^2 = 1 - \frac{1}{3} = \frac{2}{3}$$

$$\frac{\frac{1}{2} \times \frac{2\sqrt{3}}{3}}{\frac{1}{2} \times \frac{2}{3}} = \sqrt{3} \rightarrow \tan \theta \rightarrow \theta = 60^\circ$$

$$\text{Rad } 60^\circ = \frac{\pi}{3} \quad \checkmark$$

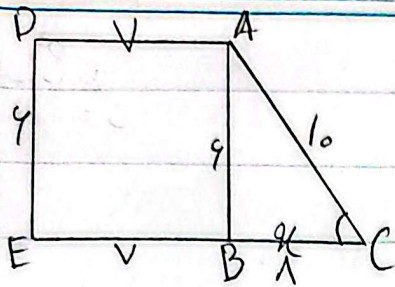
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$$\frac{\sin \theta}{\cos \theta} = a$$

$$\sin \theta = a \cos \theta$$

$$\frac{1 \cos \theta}{\cos \theta} = 1 \quad \checkmark$$

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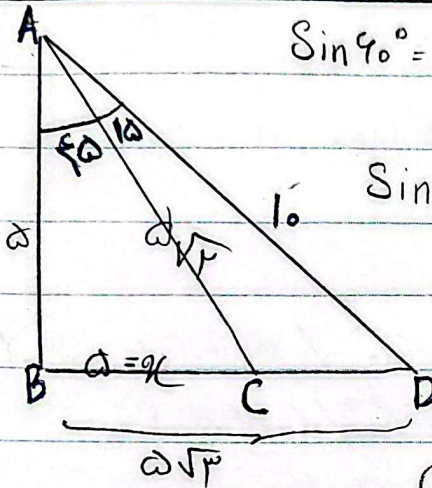


$$\sin 40^\circ = \frac{4}{10} = \frac{AB}{AC} = \frac{4}{10} \Rightarrow AC = 10$$

$$4^2 + x^2 = 10^2 \quad x^2 = 10^2 - 4^2 \Rightarrow x = 1$$

$$10 + 1 + 4 + 6 + 4 = 31$$

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$$\sin 60^\circ = \frac{\sqrt{3}}{2} = \frac{BD}{AD} = \frac{BD}{10} \Rightarrow BD = \frac{10\sqrt{3}}{2} = 5\sqrt{3}$$

$$\sin 30^\circ = \frac{1}{2} = \frac{AB}{AD} = \frac{AB}{10} \Rightarrow AB = 5$$

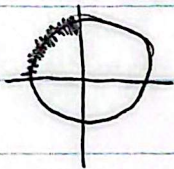
$$\cos 60^\circ = \frac{1}{2} = \frac{AB}{AC} = \frac{5}{AC} = \frac{1}{2} \Rightarrow AC = \frac{10}{2} = 5$$

$$AC = 5\sqrt{3}$$

$$(5\sqrt{3})^2 = x^2 + 5^2 \rightarrow 20 = 2x + x^2 \quad x^2 = 2x$$

$$x = 2$$

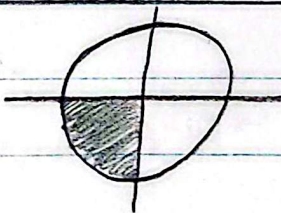
$$CD = 5\sqrt{3} - 5$$



ناحیه دوم



9- ناحیه سوم



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

$$\sin x = \frac{1}{10}$$

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$$3 \sin x = \cos x$$

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

$$\sin^2 x + \cos^2 x = 1$$

$$\sin^2 x + 9 \sin^2 x = 1$$

$$10 \sin^2 x = 1$$

چون در ناحیه سوم

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