

$$۲۷) \quad ۲۷^\circ = (n) \text{rad} \quad ۲۷ \times \frac{\pi}{180} \Rightarrow \frac{۲۷\pi}{180} = n$$

$$۲۸) \quad ۱۷^\circ = (n) \text{rad} \quad ۱۷ \times \frac{\pi}{180} \Rightarrow \frac{۱۷\pi}{180} = n$$

$$۲۹) \quad \frac{\omega\pi}{12} \text{rad} = (n)^\circ \quad \frac{\omega\pi}{12} \times \frac{180}{\pi} \Rightarrow \omega^\circ = n$$

$$۳۰) \quad \frac{5\pi}{4} \text{rad} = (n)^\circ \quad \frac{5\pi}{4} \times \frac{180}{\pi} \Rightarrow 180^\circ = n$$

$$\frac{a\pi}{1} \times \frac{180}{\pi} = \frac{a \times 180}{1}$$

$$\frac{6\omega a}{1} + \frac{4\omega a}{1} + \frac{4\omega a}{1} = 180^\circ \Rightarrow \frac{14\omega a}{1} = 180^\circ$$

$$\frac{180a}{9} = \frac{\pi}{180} \Rightarrow \frac{180 \times 180a}{9} = \frac{180 \times 180a}{9} = \frac{180 \times 180a}{9} = \frac{180 \times 180a}{9}$$

$$6\omega a = 180$$

$$a = \frac{180}{6\omega} \Rightarrow a = \frac{30}{\omega}$$

$$۳۱) \quad \cos 40^\circ \cos 50^\circ - \sin 40^\circ \sin 50^\circ - \tan 40^\circ + \cot 50^\circ = \left(\frac{1}{2} \times \frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{3}}{2} \times \frac{1}{2}\right) - 1 + 2 =$$

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

$$۳۲) \quad \frac{\tan^2 30^\circ + \tan^2 60^\circ + \tan^2 40^\circ}{\cot^2 30^\circ - \cot^2 40^\circ} = \frac{\left(\frac{\sqrt{3}}{3}\right)^2 + 1^2 + (\sqrt{3})^2}{\frac{1}{\sqrt{3}} - \frac{\sqrt{3}}{1}} = \frac{\frac{4}{3} + 1 + 3}{\frac{1}{\sqrt{3}} - \frac{\sqrt{3}}{1}} =$$

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

$$\tan \theta = ?$$

$$-\sin 30^\circ \cos 40^\circ + \cos 30^\circ \sin 40^\circ = \sin \theta$$

$$\left(-\frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}\right) = -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} = \frac{1}{2} \Rightarrow \frac{1}{2} = \sin^2 \theta \Rightarrow \sin \theta = \pm \frac{\sqrt{2}}{2}$$

چون نفعه حاده پس فقط $+\frac{\sqrt{2}}{2}$ قبله و تنها زاویه حاده که $\sin$ آن $\frac{\sqrt{2}}{2}$ است زاویه 45° از ربع اول است بنابرین:

$$\theta = 45^\circ \Rightarrow \tan 45^\circ = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$$

$$\frac{\tan 30^\circ (1 - \tan^2 40^\circ)}{(1 - \cot^2 40^\circ)^2} = \tan \theta \Rightarrow \frac{\frac{1}{\sqrt{3}} \left(1 - \frac{1}{3}\right)}{\left(1 - \frac{1}{3}\right)^2} = \frac{\frac{1}{\sqrt{3}} \left(\frac{2}{3}\right)}{\left(\frac{2}{3}\right)^2} = \frac{\frac{2}{3\sqrt{3}}}{\frac{4}{9}} = \frac{2}{3\sqrt{3}} \times \frac{9}{4} = \frac{3}{2\sqrt{3}} = \frac{\sqrt{3}}{2}$$

$$\cot 40^\circ = \frac{1}{\tan 40^\circ} = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} \Rightarrow \frac{2}{\sqrt{3}} = \frac{1}{\tan \theta} \Rightarrow \tan \theta = \frac{\sqrt{3}}{2} \Rightarrow \theta = 40^\circ$$

$$40 \times \frac{\pi}{180} = \frac{2\pi}{9}$$

$$\tan \theta = \omega \Rightarrow \frac{\sin \theta}{\cos \theta} = \omega \Rightarrow \frac{3 \sin \theta - \cos \theta}{\sin \theta - 4 \cos \theta} \Rightarrow \frac{3x(\omega \cos \theta) - \cos \theta}{\omega \cos \theta - 4 \cos \theta} = \frac{1 \cos \theta}{\cos \theta} = 1$$

$\sin \theta = \omega \cos \theta$ جایگذاری

$$\sin \alpha = \frac{4}{10} \quad P_{\sin} = ? \quad \sin \alpha = \frac{AB}{BC} = \frac{4}{10} \Rightarrow \frac{4}{BC} = \frac{4}{10} \Rightarrow BC = \frac{4 \times 10}{4} = 10$$

$AB = 4$

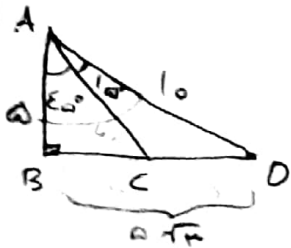
$AC^2 = 100 - 34 \Rightarrow AC^2 = 46 \Rightarrow AC = \sqrt{46}$

$\boxed{AC = \sqrt{46}}$

$\boxed{BC = 10}$

$$P_{\cos} = 10 + 10 + 4 + 4 = 38$$

$$P_{\cos} = ?$$



$$\sin 45^\circ = \frac{BD}{10} \Rightarrow BD = \frac{10 \cdot \frac{\sqrt{2}}{2}}{1} = 5\sqrt{2}$$

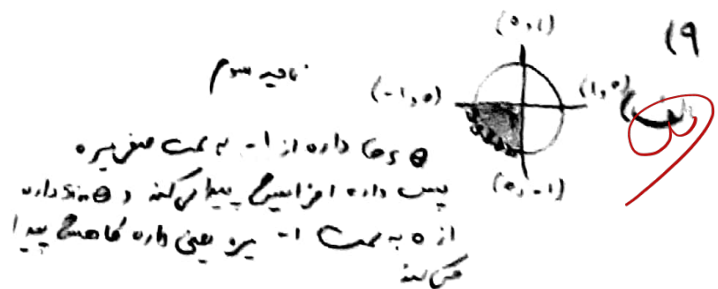
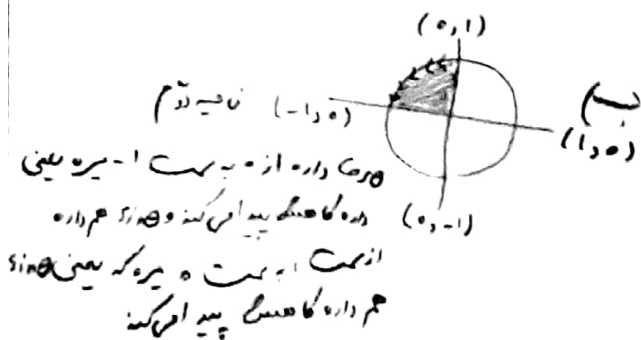
$$AB^2 = 100 - (4\sqrt{2})^2 = 100 - 32 = 68 \Rightarrow AB = \sqrt{68} = 2\sqrt{17}$$

$$\cos 45^\circ = \frac{AD}{10} = \frac{4\sqrt{2}}{10} \Rightarrow AD = 4\sqrt{2}$$

$$\sin 45^\circ = \frac{BD}{10} = \frac{5\sqrt{2}}{10} \Rightarrow BD = 5\sqrt{2}$$

$$BC = 6$$

$$\boxed{DC = 6(\sqrt{2} - 1)}$$



$$\tan \alpha = \frac{1}{3} \quad \sin \alpha = ? \quad \cos \alpha = ?$$



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

$$\sin^2 \alpha + 9 \sin^2 \alpha = 1 \Rightarrow 10 \sin^2 \alpha = 1 \Rightarrow \sin^2 \alpha = \frac{1}{10} \Rightarrow \sin \alpha = \frac{1}{\sqrt{10}}$$

$$\boxed{\frac{1}{\sqrt{10}}}$$

$$\leftarrow \text{چون دایره واحد است } \sin \alpha \text{ منفرجه باشد } \leftarrow \pm \frac{1}{\sqrt{10}}$$