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$$\text{الف) } 27^\circ = (n) \text{ rad} \Rightarrow \frac{27^\circ}{180} \times \pi = \text{rad} = \frac{3\pi}{20} = \frac{3\pi}{20} \text{ rad}$$

$$\text{ب) } 125^\circ = (n) \text{ rad} \Rightarrow \frac{125}{180} \times \pi = n \text{ rad} = \frac{25\pi}{36} \text{ rad}$$

$$\text{ج) } \frac{5\pi}{12} \text{ rad} = (n)^\circ \Rightarrow \frac{180}{\pi} \times \frac{5\pi}{12} \text{ rad} = (n)^\circ = 75^\circ$$

$$\text{د) } \frac{5\pi}{9} \text{ rad} = (n)^\circ \Rightarrow \frac{180}{\pi} \times \frac{5\pi}{9} \text{ rad} = (n)^\circ = 100^\circ$$

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$$\frac{125a}{9} \text{ grad} \times \frac{9}{10} = (125a)^\circ$$

$$\frac{9\pi}{1} \times \frac{180}{\pi} = \frac{9\pi}{1} \times \frac{180}{\pi} = 1620a$$

$$\frac{9\pi}{1} \times \frac{180}{\pi} + 125a^\circ + 10a^\circ = 180^\circ$$

$$\Rightarrow 1620a = 180^\circ \Rightarrow a = 11.25^\circ$$

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$$\text{الف) } \cos 40^\circ \cos 30^\circ - \sin 40^\circ \sin 30^\circ - \tan 40^\circ + \cot 40^\circ$$

$$= \cos 40^\circ \sin 40^\circ - \sin 40^\circ \cos 40^\circ - 1 + 1 = 0$$

$$\text{ب) } \frac{\tan^2 30^\circ + \tan^2 40^\circ + \tan^2 50^\circ}{\cot^2 30^\circ - \cot^2 40^\circ} = \frac{1}{3} + 1 + 3 = \frac{13\sqrt{3}}{4}$$

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

$$= -\sin^2 30^\circ + \cos^2 30^\circ = \sin \theta = -\frac{1}{4} + \frac{3}{4} = \sin \theta \Rightarrow \sin \theta = \frac{1}{2}$$

$$\sin^2 \theta + \cos^2 \theta = 1 \Rightarrow \cos^2 \theta = \frac{3}{4} \Rightarrow \cos \theta = \frac{\sqrt{3}}{2} \text{ and } \tan \theta = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

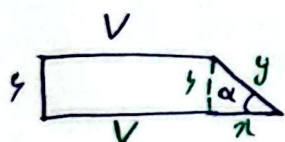
$$\frac{r \tan 30^\circ (1 - \tan^2 30^\circ)}{(1 - \cot^2 30^\circ)^2} = \frac{r \tan 30^\circ - r \tan^3 30^\circ}{\left(\frac{r}{r}\right)^2} = \frac{\frac{r}{\sqrt{3}} - \frac{r}{3\sqrt{3}}}{\frac{r}{9}} = \frac{\frac{2r}{3\sqrt{3}}}{\frac{r}{9}} = \frac{2\sqrt{3}}{1}$$

$$\Rightarrow \frac{\frac{2\sqrt{3}}{1}}{\frac{1}{9}} = \sqrt{3} = \tan \theta \quad \theta = 60^\circ \quad \frac{60^\circ \times \pi}{180} = \frac{\pi}{3} \text{ rad}$$

$$\theta = 60^\circ$$

$$\tan \theta = a \quad \tan^2 \theta + 1 = \frac{1}{\cos^2 \theta} \Rightarrow r^2 = \frac{1}{\cos^2 \theta} \Rightarrow \cos^2 \theta = \frac{1}{r^2}$$

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - r \cos \theta} \Rightarrow \frac{\frac{1}{\sqrt{r^2}} - \frac{1}{\sqrt{r^2}}}{\frac{a}{\sqrt{r^2}} - \frac{r}{\sqrt{r^2}}} = \frac{\frac{1}{\sqrt{r^2}}}{\frac{1}{\sqrt{r^2}}} = 1$$



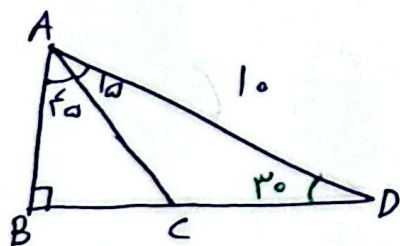
$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\frac{r^2}{100} + \cos^2 \alpha = 1 \Rightarrow \cos \alpha = \frac{1}{10}$$

$$\cot \alpha = \frac{n}{s} = \frac{1}{s} \Rightarrow n = 1$$

$$y^2 = n^2 + s^2 \Rightarrow y^2 = 100 \Rightarrow y = 10$$

$$10 + V + V + s + 1 = 31$$



$$\overline{AB} = 10 \times \sin 30^\circ = 5$$

$$\overline{BD} = 10 \times \sin 60^\circ = 5\sqrt{3}$$

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

$$\overline{BC} = \overline{AB} \rightarrow \epsilon = \hat{A} \text{ چون } \tan \epsilon = 1 = \frac{BC}{AB}$$

9- الف) ناصبی دوم (ب) ناصبی سوم

$$\tan^2 n + 1 = \frac{1}{\cos^2 n} \Rightarrow \frac{1}{9} + 1 = \frac{1}{\cos^2 n} = \frac{10}{9} \Rightarrow \cos^2 n = \frac{9}{10}$$

$$\cos^2 n + \sin^2 n = 1 \Rightarrow \sin^2 n = \frac{1}{10} \Rightarrow \sin n = \frac{1}{\sqrt{10}}$$