

$$الف) 27^\circ = (n) \text{ rad} \rightarrow \frac{D}{180} = \frac{\text{rad}}{\pi} \Rightarrow \frac{27\pi}{180} = \text{rad} \Rightarrow n = \frac{27\pi}{20} \quad (1)$$

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

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

$$د) \frac{4\pi}{9} \text{ rad} = (m)^\circ \Rightarrow \frac{4\pi}{9} = \frac{D}{180} \Rightarrow m = 110^\circ$$

$$\frac{G}{200} = \frac{D}{180} = \frac{\text{rad}}{\pi} \quad (2)$$

$$\frac{a\pi}{1} = \frac{D}{180} \rightarrow D = 22.5^\circ a$$

$$\Rightarrow 10a + 22.5a + 12.5a = 180$$

$$a(10 + 22.5 + 12.5) = 180$$

$$45a = 180$$

$$a = 4$$

$$\frac{12.5a}{200} = \frac{D}{180} \rightarrow D = 11.25^\circ a$$

$$الف) \cos 54^\circ \cos 36^\circ - \sin 54^\circ \sin 36^\circ - \tan 45^\circ + 2 \cot 45^\circ \quad (3)$$

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

$$ب) \frac{\tan^2 30^\circ + \tan^2 45^\circ + \tan^2 60^\circ}{\cot^2 30^\circ - \cot^2 45^\circ} = \frac{\left(\frac{1}{\sqrt{3}}\right)^2 + (1)^2 + (\sqrt{3})^2}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{13}{2\sqrt{3}}$$

$$= \frac{13}{2\sqrt{3}} \times \frac{2\sqrt{3}}{2\sqrt{3}} = \frac{13\sqrt{3}}{4}$$

$$- \sin 36^\circ \cos 54^\circ + \cos 36^\circ \sin 54^\circ = \sin^2 \theta \quad (4)$$

$$- \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \sin^2 \theta \quad \tan \theta = \tan 45^\circ = +1$$

$$= \frac{1}{4} + \frac{3}{4} = \sin^2 \theta$$

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$$\frac{1}{4} + \frac{3}{4} = \sin^2 \theta \rightarrow \sin \theta = \pm \frac{\sqrt{1}}{2} \Rightarrow \sin 45^\circ$$

$$\frac{r \tan 40^\circ (1 - \tan^2 40^\circ)}{(1 - \cot^2 40^\circ)^2} = \frac{\frac{r\sqrt{r}}{r} \times (1 - \frac{1}{r})}{(1 - \frac{1}{r})^2} = \frac{\frac{r}{r\sqrt{r}}}{\frac{r}{r}} \quad (a)$$

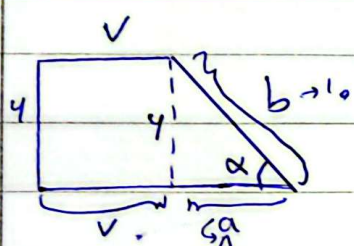
$$= \frac{1}{\sqrt{r}} = \frac{r}{\sqrt{r}} \times \frac{\sqrt{r}}{\sqrt{r}} = \sqrt{r} \Rightarrow \tan \theta = \sqrt{r}$$

$$\text{مثلاً: } \theta \Rightarrow \text{دریجه} \Rightarrow \theta = 40^\circ \Rightarrow \frac{D}{1n_0} = \frac{\text{rad}}{\pi} \Rightarrow \frac{40\pi}{1n_0} = \text{rad}$$

$$\Rightarrow \text{rad} = \frac{\pi}{r}$$

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - r \cos \theta} \xrightarrow{\text{صورت و مخرج را تقسیم بر } \cos \theta} \frac{r \frac{\sin \theta}{\cos \theta} - \frac{\cos \theta}{\cos \theta}}{\frac{\sin \theta}{\cos \theta} - \frac{r \cos \theta}{\cos \theta}} \quad (4)$$

$$= \frac{r \tan \theta - 1}{\tan \theta - r} = \frac{r(a) - 1}{a - r} = \frac{1r}{1} = 1r$$



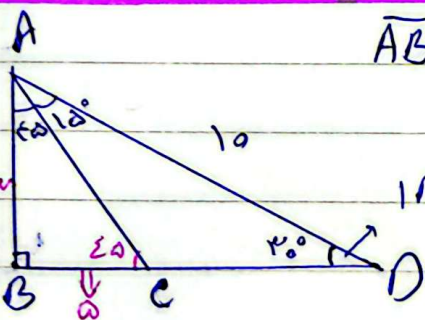
$$\sin \alpha = \frac{4}{b}$$

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

$$a^2 + 4^2 = b^2 \Rightarrow a^2 = 100 - 16$$

$$a^2 = 84 \Rightarrow a = 9$$

$$P = 4 + v + 10 + 9 + v = 31$$



$$\overline{AB} = 10 (\sin 40^\circ) \Rightarrow \overline{AB} = 10 \times \frac{1}{2} = \overline{AB} = 5 \quad (1)$$

$$100 - 4a - 40 = 10$$

$$AB^2 + BD^2 = AD^2$$

$$CD = BD - BC$$

$$BD^2 = 100 - 2a$$

$$CD = a\sqrt{r} - a = a(\sqrt{r} - 1)$$

$$BD = \sqrt{2a}$$

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الف) زاویه سوم
 $110^\circ < \theta < 270^\circ$

ب) زاویه دوم
 $90^\circ < \theta < 180^\circ$

(9)

$$\tan \alpha = \frac{1}{3}$$

(10)

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

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

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

نشان بدهیم که در این حالت

$$\Rightarrow \sin \alpha = -\frac{\sqrt{10}}{10}$$