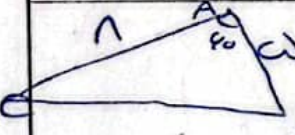


الف)  $3:54'$ $\frac{54}{2} = 27$ $110 + 27 + 4 = 141^\circ$
 ب) $30 \times 4 = 120$ $\frac{54}{2} = 27$ $110 + 27 + 4 = 141^\circ$
 زاویه کوچک 141°
 زاویه بزرگتر 207°

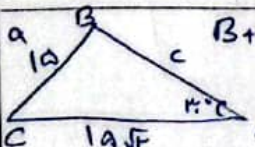
ب) $\left| \left(\min \alpha \frac{11}{2} \right) - (h \times 30) \right| = 297 - 90 = 207 \rightarrow 360 - 207 = 153$
 زاویه کوچک 153°
 زاویه بزرگتر 207°

الف)  $2:40$ $2 \times 30 = 60$ $\frac{18}{2} = 9$ $40 + 9 + 11 = 60$ 279
 ب) $\left| \left(\min \alpha \frac{11}{2} \right) - (h \times 30) \right| = 180 - 99 = 81$
 زاویه کوچک 81°
 زاویه بزرگتر 279°

الف)  $S_{\text{قطاع}} : \frac{\alpha}{2} R^2 = \frac{30}{2} \times 9 = \frac{30}{2} \times 9 = \frac{270}{2} = 135$
 ب) $P_{\text{قطاع}} = \frac{R}{2} \times \alpha = \frac{9}{2} \times 30 = 135$
 زاویه 30°

الف)  $S_{\triangle ABC} = \frac{1}{2} \times a \times b \times \sin C = \frac{1}{2} \times 10 \times 10 \times \sin 40^\circ = 10\sqrt{3}$

ب) $P_{\triangle ABC} = a^2 = b^2 + c^2 - 2bc \cos A = a^2 = 1^2 + 1^2 - 1 \times 1 \times \frac{1}{2}$
 $a^2 = \frac{3}{2} \rightarrow a = \sqrt{\frac{3}{2}} = \frac{\sqrt{6}}{2}$
 $P = 1 + a + \frac{\sqrt{6}}{2} = 20$

 $B + C = 180^\circ \rightarrow A = 110^\circ$ $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
 $\frac{10}{\sin 110^\circ} = \frac{10\sqrt{2}}{\sin B} \rightarrow \sin B = \frac{\sqrt{2}}{2}$ $B = 45^\circ$
 $180 - 45 = 135^\circ = C$
 $C = \frac{10\sqrt{2}}{\sin 135^\circ} = \frac{10\sqrt{2}}{\frac{\sqrt{2}}{2}} = 20$

$$\frac{\tan(x-\alpha) + r \tan(x+\alpha)}{\tan(x-\alpha) - \tan(x+\alpha)} = \frac{-\tan\alpha + r \tan\alpha}{-\tan\alpha - \tan\alpha} = \frac{r \tan\alpha}{-2 \tan\alpha} = -\frac{r}{2}$$

جواب ←

$$A = \frac{r \tan \alpha + \tan \alpha}{r \tan \alpha - \tan \alpha} = \frac{r \tan(\frac{x}{r} - \alpha) + \tan(\frac{x}{r} + \alpha)}{r \tan(\frac{x}{r} - \alpha) - \tan(\frac{x}{r} + \alpha)} =$$

$$\frac{r \cot \alpha - \cot \alpha}{-r \tan \alpha - \cot \alpha} \Rightarrow \frac{\cot \alpha}{r \tan \alpha - \cot \alpha} = \frac{\frac{1}{a}}{-r a - \frac{1}{a}} = \frac{\frac{1}{a}}{\frac{-r a^2 - 1}{a}} = \frac{1}{-r a^2 - 1}$$

$$\frac{\sin x + \cos x}{\sin x - \cos x} + \frac{\sin x - \cos x}{\sin x + \cos x} = r \Rightarrow \frac{r}{\sin^2 x - \cos^2 x} = r \Rightarrow r \sin^2 x - r \cos^2 x = r$$

$$\rightarrow \frac{r \sin^2 x}{r \cos^2 x} - \frac{r \cos^2 x}{r \cos^2 x} = \frac{r}{r \cos^2 x} \rightarrow \tan^2 x = \frac{r}{\cos^2 x} + 1 \rightarrow \tan^2 x = \frac{r}{\cos^2 x} \left(\frac{1}{\cos^2 x} + \cos^2 x \right) \Rightarrow \tan^2 x = \frac{r}{\cos^2 x} (1 + \tan^2 x)$$

$$\tan^2 x = \frac{r}{\cos^2 x} + \frac{r}{\cos^2 x} \tan^2 x + 1 \rightarrow \tan^2 x - \frac{r}{\cos^2 x} \tan^2 x = \frac{1}{\cos^2 x} \rightarrow \frac{1}{\cos^2 x} \tan^2 x = \frac{1}{\cos^2 x} \rightarrow \tan^2 x = 1 \rightarrow \tan x = 1$$

جواب ←

$$\frac{\sin^2 x - r \cos^2 x + 1}{\sin^2 x + r \cos^2 x - 1} = \varepsilon \Rightarrow \frac{\sin^2 x - r \cos^2 x + \sin^2 x + \cos^2 x}{\sin^2 x + r \cos^2 x - \sin^2 x - \cos^2 x} = \frac{r \sin^2 x - \cos^2 x}{\cos^2 x} = \varepsilon$$

$$\rightarrow \varepsilon \cos^2 x = r \sin^2 x - \cos^2 x \rightarrow \frac{\varepsilon \cos^2 x}{r \cos^2 x} = \frac{r \sin^2 x}{r \cos^2 x} \rightarrow \tan^2 x = \frac{\varepsilon}{r}$$

جواب ←

$$\cos(r, \alpha) = \cos \frac{r}{r} \alpha = \frac{1 + \cos \varepsilon \alpha}{r} \rightarrow \cos \frac{r + \sqrt{r}}{\varepsilon} = \frac{\sqrt{r + \sqrt{r}}}{r}$$

$$\sin(r, \alpha) = \sin \frac{r}{r} \alpha = \frac{1 - \cos \varepsilon \alpha}{r} \rightarrow \sin \frac{r + \sqrt{r}}{\varepsilon} = \frac{\sqrt{r + \sqrt{r}}}{r}$$

جواب ←