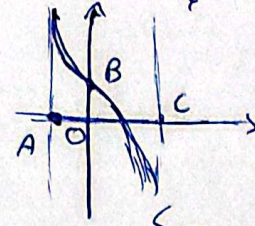


$\frac{r}{\sin \alpha} + \frac{r}{\cos \alpha} = 1 \Rightarrow r \cos \alpha = -r \sin \alpha$ $\Rightarrow \tan \alpha = -\frac{r}{r}$ $\Rightarrow \tan \alpha = -1$ $\tan \alpha + \cot \alpha = -\frac{r}{r} + \left(-\frac{r}{r}\right) = -\frac{2r}{r}$	6
	7
$(1 - r \sin^2 \alpha) (r \cos^2 \alpha - 1) \left(\frac{1 - \tan^2 \alpha}{1 + \tan^2 \alpha} \right) = \cos^2 \alpha \times \cos^2 \alpha \times \cos^2 \alpha =$ $\times \frac{\sin^2 \alpha}{\sin^2 \alpha} \Rightarrow \frac{1}{r} \frac{\sin^2 \alpha \times \cos^2 \alpha \times \cos^2 \alpha}{\sin^2 \alpha} = \frac{1}{r} \frac{\sin^2 \alpha \times \cos^2 \alpha}{\sin^2 \alpha} \times \frac{1}{1} \frac{\sin^2 \alpha}{\sin^2 \alpha}$ $= \frac{1}{r} \frac{\cos^2 \alpha}{\sin^2 \alpha} = \frac{1}{r} \cot^2 \alpha = 1 \tan^2 \alpha$	8
	9
	10

جانب اول: $A - 2\pi + \frac{\pi}{6} = \frac{\pi}{6} \Rightarrow -2\pi = \frac{\pi}{6} - \frac{\pi}{6} \Rightarrow \pi = -\frac{\pi}{1} \rightarrow A(-\frac{\pi}{1}, 0)$ جانب دوم: $C - \pi + \frac{\pi}{6} = -\frac{\pi}{6} \Rightarrow -\pi = -\frac{\pi}{6} - \frac{\pi}{6} \Rightarrow \pi = \frac{\pi}{3} \rightarrow C(\frac{\pi}{3}, 0)$ نقطه B: $\pi = 0 \Rightarrow \sin \frac{\pi}{6} = 1 \rightarrow B(0, 1)$ $S_{ABC} = \frac{AC \times OB}{2} = \frac{\frac{\pi}{3} \times 1}{2} = \frac{\pi}{6}$ 	۱
$r^2 - (\sin u) r - \frac{1}{6} \cos^2 u = 0 \Rightarrow \frac{r}{a} - \frac{r}{a} \sin u - \frac{1}{6} + \frac{1}{6} \sin^2 u = 0 \Rightarrow$ $\frac{1}{6} \sin^2 u - \frac{r}{a} \sin u + \frac{1}{6} = 0 \Rightarrow a \sin^2 u - r \sin u + \frac{1}{6} = 0 \Rightarrow \sin^2 u - r \sin u + \frac{1}{6} = 0$ $\Rightarrow \sin u = \frac{1}{r} \Rightarrow \sin^2 u = \frac{1}{a^2} \Rightarrow \cos^2 u = \frac{a^2}{a^2} \Rightarrow \frac{1}{\cos^2 u} = \frac{a^2}{1} = 1 + \tan^2 u$	۲
$\log(\sin u) - \log(-\cos u) = \log r \Rightarrow \log -\tan u = \log r \Rightarrow -\tan u = r$ $\sin u > 0, -\cos u > 0 \Rightarrow \cos u < 0 \Rightarrow \frac{\sin u}{-\cos u} = r \Rightarrow \sin u = -r \cos u$ $\Rightarrow \sin^2 u + \cos^2 u = 1 \Rightarrow a \cos^2 u + r^2 \cos^2 u = 1 \Rightarrow \cos^2 u = \frac{1}{1+r^2} \Rightarrow \cos u = \frac{1}{1+r^2}$ $\Rightarrow \sin u = \frac{r}{1+r^2} \Rightarrow \sin u - \cos u = \frac{r}{1+r^2} - \frac{1}{1+r^2} = \frac{r-1}{1+r^2}$	۳
$\sin^2 \theta + \cos^2 \theta = \frac{r}{a} \Rightarrow \sin^2 \theta - \sin^2 \theta + 1 = \frac{r}{a} \Rightarrow \sin^2 \theta (\sin^2 \theta - 1) = -\frac{1}{a}$ $-\sin^2 \theta \cos^2 \theta = -\frac{1}{a} \quad (I) \quad \cos^2 \theta + \sin^2 \theta = \cos^2 \theta (\cos^2 \theta - 1) + 1 =$ $-\sin^2 \theta \cos^2 \theta + 1 \xrightarrow{I} -\frac{1}{a} + 1 = \frac{r}{a}$	۴
$\frac{r \sin u + \sin u \cos u}{r - r \cos^2 u} < 0 \Rightarrow \frac{\sin u (r + \cos u)}{r (1 - \cos^2 u)} < 0 \Rightarrow \frac{r + \cos u}{r \sin u} < 0$ $\frac{r}{r} + \frac{\cos u}{\sin u} < 0 \Rightarrow 1 + \cot u < 0 \Rightarrow \cot u < -1$ $\Rightarrow \frac{\cos u}{\sin u} < -1 \Rightarrow \cos u < -\sin u$ $\Rightarrow \cos u + \sin u < 0$	۵