۱

الف) $۴\times۳۰=۱۲۰$ $\quad \frac{۱}{۲}\times۵۴=۲۷$ $\quad ۱۲۰+۲۷+۶=۱۵۳^\circ$ $\quad ۳۶۰-۱۵۳=۲۰۷$

ب) $۵٫۵\,min-۳۰h \Rightarrow \frac{۱}{۲}\times۵۴-۳۰\times۳=۲۰۷$ $\quad ۳۶۰-۲۰۷=۱۵۳$

۳

سوال ۳

الف) $\frac{\pi}{۶}=۳۰$ $\quad \frac{۳۰}{۳۶۰}=\frac{۱}{۱۲}$ $\quad S=\pi R^۲ \Rightarrow ۹\pi cm^۲$ $\quad \frac{۱}{۱۲}\times۹\pi=\frac{۳\pi}{۴} \rightarrow S$

ب) $P=\pi\times۲R \rightarrow ۶\pi$ $\quad ۶\pi\times\frac{۱}{۱۲}=\frac{\pi}{۲}$ $\quad \frac{\pi}{۲}+۶$

۲

سوال ۲

الف) $۲\times۳۰=۶۰$ $\quad ۲\times۶=۱۲$ $\quad ۱۸\times\frac{۱}{۲}=۹$ $\quad ۱۲+۹+۶۰=۸۱$

ب) $\alpha=\left|\frac{۱۱}{۲}min-۳۰h\right| \Rightarrow \left|\frac{۱۱}{۲}\times۱۸-۳۰\times۶\right|=|۹۹-۱۸۰|=۸۱$

۴

سوال ۴

$$\frac{۵\times۸\times\frac{\sqrt{۳}}{۲}}{۲}=۱۰\sqrt{۳} \Rightarrow S$$

$$BC=\sqrt{۲۵+۶۴-۸۰\times\cos۶۰}=\sqrt{۸۹-۴۰}=\sqrt{۴۹}=۷ \qquad P=۷+۵+۸=۲۰$$

۵

$$\frac{۱۵}{\sin A}=\frac{۱۵\sqrt{۲}}{\sin B}=\frac{AB}{\sin C} \qquad \frac{۱۵}{\frac{۱}{۲}}=۳۰=\frac{۱۵\sqrt{۲}}{\frac{\sqrt{۲}}{۲}} \Rightarrow B=۴۵^\circ \quad C=۱۸۰-۴۵=۱۰۵^\circ$$

$$\boxed{\frac{\pi}{۴},\ \frac{\pi}{۶},\ \frac{۷\pi}{۱۲}}$$

$$\frac{-\tan\alpha + 2\tan\alpha}{-\tan\alpha - \tan\alpha} = -\frac{2\tan\alpha}{2\tan\alpha} = -1$$

$$\frac{2\tan\left(\frac{\pi}{2} - \frac{\pi}{12}\right) + \tan\left(\frac{\pi}{2} + \frac{\pi}{12}\right)}{2\tan\left(\pi - \frac{\pi}{12}\right) + \tan\left(\frac{4\pi}{2} + \frac{\pi}{12}\right)} = \frac{2\frac{1}{a} - \frac{1}{a}}{-2a - \frac{1}{a}} = \frac{\frac{1}{a}}{\frac{-2a^2-1}{a}} = \frac{1}{2a^2-1} \Rightarrow \lambda = \frac{-1}{2a^2+1}$$

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

$$1 + \tan^2 x = \frac{1}{\cos^2 x} \Rightarrow \tan^2 = \frac{4}{3}$$

$$4\sin^2 x + 1\cos^2 x - 3 = \sin^2 x - 2\cos^2 x + 1 \qquad 2\sin^2 x + 2\cos^2 x + 5\cos^2 x = 4$$

$$\Rightarrow \cos^2 x = \frac{2}{5} \qquad \Rightarrow 1 + \tan^2 = \frac{1}{\cos^2} \Rightarrow \tan^2 = \frac{3}{2}$$

$$\cos(22,5) = \sqrt{\frac{1+\cos 45}{2}} = \frac{1+\sqrt{2}}{2} = \frac{\sqrt{2+\sqrt{2}}}{2}$$

$$\sin^2 67,5 = \sqrt{\frac{1-\cos 135}{2}} = \sqrt{\frac{1+\frac{\sqrt{2}}{2}}{2}} = \frac{\sqrt{2+\sqrt{2}}}{2}$$