$a^2 = b^2 + c^2 - 2bc\cos A$

$\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Prove the following identities:

$$\frac{\cos A}{a} + \frac{\cos B}{b} + \frac{\cos C}{c} = \frac{a^2 + b^2 + c^2}{2abc}$$

$$LHS = \frac{(b^2 + c^2 - a^2)}{a(2bc)} + \frac{(b^2 + a^2 - c^2)}{c(2ba)} + \frac{(c^2 + a^2 - b^2)}{b(2ac)}$$

$$= \frac{b^2 + c^2 - a^2 + b^2 + a^2 - c^2 + c^2 + a^2 - b^2}{2abc}$$

$$= \frac{a^2 + b^2 + c^2}{2abc}$$

Q6

P404

(Cm)

$\cos 2A = \cos^2 A - \sin^2 A$

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

Prove the following identities:

$$2\cos^2 A - \cos 2A - 1 = 0$$

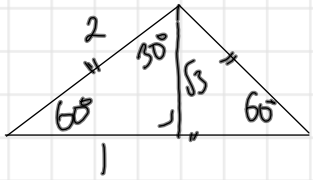
$$LHS = 2\cos^2 A - \cos^2 A + \sin^2 A - 1$$

$$= \cos^2 A + \sin^2 A - 1$$

$$= 1 - 1$$

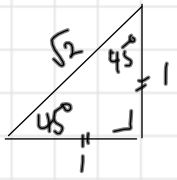
$$= 0$$

Log tables p.13



$\sin 60° = \sqrt{3}/2$
$\cos 60° = 1/2$
$\tan 60° = \sqrt{3}$

$\sin 30° = 1/2$
$\cos 30° = \sqrt{3}/2$
$\tan 30° = 1/\sqrt{3}$



$\sin 45° = 1/\sqrt{2}$

$\cos 45° = 1/\sqrt{2}$

$\tan 45° = 1$

COMPOUND ANGLES

(P.14 Log tables)

$\sin(A-B)$

$= \sin A\cos B - \cos A \sin B$

$\sin 45 = 1/\sqrt{2}$
$\cos 30 = \sqrt{3}/2$
$\cos 45 = 1/\sqrt{2}$
$\sin 30 = 1/2$

$\sin 15°$ write answer without calculator

$$\sin(45° - 30°) = \left(\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{3}}{2}\right) - \left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{2}\right)$$

$$= \frac{\sqrt{3}}{2\sqrt{2}} - \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}-1}{2\sqrt{2}}$$

$$\Rightarrow \frac{\sqrt{6}-\sqrt{2}}{4}$$

(HW) P.399
Q1 (v) (vi) (viii)
Q4, 6, 10

$\tan(A+B)$

$= \frac{\tan A + \tan B}{1 - \tan A \tan B}$

Q10 $\tan A = 4$, $\tan(A+B) = 5$

$0 \leq A \leq \pi/2$, $0 \leq B \leq \pi/2$

$$5 = \frac{4 + \tan B}{1 - 4\tan B}$$

$$5 - 20\tan B = 4 + \tan B$$

$$1 = 21\tan B$$

$$\tan B = 1/21$$

P.404 (CM)
Q4

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

$\sin 2\theta = 2\cos\theta\sin\theta$

Prove the following identities:

$$(\cos\theta + \sin\theta)^2 = 1 + \sin 2\theta$$

$$= \cos^2\theta + 2\sin\theta\cos\theta + \sin^2\theta$$

$$= 1 + 2\sin\theta\cos\theta$$

$$= 1 + \sin 2\theta$$