

(35) Applying the Addition Formulae in Trig

WORKING AT D/E

(1) Using the formula book with $A = 45^\circ$ and $B = 30^\circ$ show that the exact value of $\sin(75^\circ)$ is

$$\frac{\sqrt{2} + \sqrt{6}}{4}$$

(2) Use the formula book to write $\cos 60 \cos 45 + \sin 60 \sin 45$ in the form $\cos P$ where P is an acute angle.

(3) (a) Using the formula book, show that

$$\tan 15^\circ = \frac{1 - \frac{1}{\sqrt{3}}}{1 + \frac{1}{\sqrt{3}}}$$

(b) Hence, without a calculator, show that $\tan 15^\circ = 2 - \sqrt{3}$

WORKING AT B/C

(1) Using the expansion of $\cos(A + B)$ show that

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{6} - \sqrt{2}}{4}$$

(2) Write $\frac{1+\sqrt{3}}{1-\sqrt{3}}$ in the form $\tan P$, $\frac{\pi}{2} < P < \pi$

(3) Given that $\cos A = \frac{1}{3}$ and $\cos B = \frac{1}{6}$ where A and B are both acute angles, show that:

(a) $\sin A = \frac{2\sqrt{2}}{3}$

(b) $\sin B = \frac{\sqrt{35}}{6}$

(c) $\cos(A + B) = \frac{1 - 2\sqrt{70}}{18}$

(d) $\sin(A + B) = \frac{2\sqrt{2} + \sqrt{35}}{18}$

(e) Using a calculator, show that $\tan(A + B) = -0.556$ correct to 3 significant figures.

WORKING AT A*/A

(1) Given that $\tan A = p$ and $\tan B = q$ where A is an acute angle and B is a reflex angle, show that

$$\cos(A + B) = \frac{pq - 1}{(\sqrt{1+p^2})(\sqrt{1+q^2})}$$

(2) Given that $\sin A = 0.8$ and $\cos B = 0.6$, where A is an obtuse angle and B is a reflex angle, show that $\cot(A + B) = \frac{7}{24}$