

Q1 Without using a calculator, find the values of the following (in surd form)

- (a)  $\cos 75^\circ$
- (b)  $\sin(-165^\circ)$
- (c)  $\tan\left(-\frac{\pi}{12}\right)$

Q2 Given that  $\sin X = -\frac{4}{5}$  and  $\cos Y = -\frac{8}{13}$  and  $X$  is in the same quadrant as  $Y$ , evaluate

- (a)  $\cos(X - Y)$
- (b)  $\tan(X - Y)$
- (c)  $\sin(X + Y)$

Q3 Solve the equations for values of  $x$  where  $0^\circ \leq x \leq 360^\circ$ .

- (a)  $\sin x = \cos(x + 30^\circ)$
- (b)  $\sin(x + 30^\circ) - \cos x = 0$
- (c)  $7 \tan x = 4 \tan(45^\circ - x)$

Q4 Given that  $\frac{\tan A + \tan B}{1 - \tan A \tan B} = \sqrt{3}$ , find the value of  $A + B$  where  $A$  and  $B$  are both acute.

Q5 Prove the following identities

- (a)  $\frac{\cos 3A - \cos 2A}{\sin 3A + \sin 2A} \equiv -\tan \frac{1}{2} A$
- (b)  $\frac{\sin(A + B)}{\sin(A - B)} \equiv \frac{\tan A + \tan B}{\tan A - \tan B}$
- (c)  $\cot(A + B) \equiv \frac{\cot A \cot B - 1}{\cot A + \cot B}$

Q6 The diagram consists of three identical squares. Prove that  $\alpha + \beta = \gamma$ .

