

(55) More Challenging Trigonometric Equations

WORKING AT D/E

(1) Find the **4 solutions** to the equation

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

in the interval $0 \leq x \leq 360$

(2) Find the solutions to each equation in the interval $0 \leq x \leq 360$. Give each answer to 1 decimal place where appropriate.

- (a) $\cos(x + 30) = 0.5$
- (b) $\tan(3x) = 1$
- (c) $\sin(x - 60) = 0.1$
- (d) $\tan(x + 45) = 0.85$
- (e) $\cos(4x) = 0.4$
- (f) $\sin(0.5x) = 1$
- (g) $4 \cos(x - 10) = 0.4$

(3) Show that the solutions to the equation $\cos(2x - 60) = 0.5$ in the interval $0 \leq x \leq 360$ are $x = 60, 180, 240$ and 360°

WORKING AT B/C

(1) Find the solutions to each equation in the interval $0 \leq x \leq 360$. Give each answer to 1 decimal place where appropriate.

- (a) $\cos(2x + 30) = \frac{\sqrt{3}}{2}$
- (b) $\sqrt{3} \tan(x - 25) = 1$
- (c) $\sin(3x - 30) = -0.5$
- (d) $\cos(3x) = -1$
- (e) $\cos(x - 16) = -0.25$
- (f) $\sin(4x - 60) = -0.85$
- (g) $5 \cos(0.5x) = 0.4$

(2) (a) Write $\tan(3x)$ in terms of \sin and \cos .

(b) Hence solve the equation $\sin(3x) = \cos(3x)$, $-180 \leq x \leq 180$.

(3) Show that there are 4 solutions to the equation $4\sin^2 x = 1$ in the interval $0 \leq x \leq 360$

WORKING AT A*/A

(1) (a) Solve the equation

$$\sqrt{3} \sin(2x + 30) = \cos(2x + 30), \quad -180 \leq x \leq 0$$

(b) Solve the equation $4\sin^2(3\theta - 45) = 1$ in the interval $-180 \leq \theta \leq 180$

(2) The equation $\sin(ax - b) = \frac{\sqrt{3}}{2}$ where a and b are positive constants has the solutions $x = 22.5^\circ$ and $x = 37.5^\circ$ for $-90 \leq x \leq 90$. Find possible values of a and b .

(3) Solve the equation $(\tan 3x)(2 \cos x + 5) = 0$, $-180 \leq x \leq 180$.