(27) Solving Trigonometric Equations (Using Radians)

WORKING AT D/E

(1) (a) Find the **two** solutions to the equation $2\sin(x) = 1$ for $0 \le x \le 2\pi$. Give your answers as multiples of π.

(b) Find the **two** solutions to the equation $\cos(x) = \frac{\sqrt{2}}{2}$ for $0 \le x \le 2\pi$. Give your answers as multiples of π.

(c) Find the **two** solutions to the equation $\tan(x) = \frac{1}{\sqrt{3}}$ for $0 \le x \le 2\pi$. Give your answers as multiples of π.

(2) One of the two solutions to the equation $\sin(x) = 0.4$ in the interval $-\pi \le x \le \pi$ is 0.412 correct to 3 significant figures. Find the other solution to 3 significant figures.

(3) (a) Find the 4 solutions to the equation $\tan(2x) = 1$ for $0 \le x \le 2\pi$ giving your answers in exact form and in radians.

(b) Find the 2 solutions in exact form for the equation $\cos\left(x - \frac{\pi}{6}\right) = \frac{\sqrt{2}}{2}$ for $0 \le x \le 2\pi$.

(c) Solve $\sin(3x) = 0.5$, $0 \le x \le \pi$ giving your answers in terms of π.

WORKING AT B/C

(1) (a) Show that the equation
$$2\sin^2(x) - 3\cos(x) = 0$$
can be written as $(2\cos(x) - 1)(\cos(x) + 2) = 0$

(b) Hence, solve the equation
$2\sin^2(x) - 3\cos(x) = 0$, $0 \le x \le 2\pi$

(2) (a) Show that the equation $\sqrt{3}\sin(x) = \cos(x)$ can be written in the form $\tan(x) = k$.

(b) Hence, solve the equation
$\sqrt{3}\sin(2\theta) = \cos(2\theta)$, $-\pi < \theta < \pi$ giving your answers as multiples of π.

(3) Show that there are only 3 solutions to the equation $3\sin(x) = 2\sin(x)\cos(x)$ in the interval $0 \le x \le 2\pi$

WORKING AT A*/A

(1) Solve the equation
$\sin^2\left(3x - \frac{\pi}{6}\right) = \cos^2\left(3x - \frac{\pi}{6}\right)$, $0 \le x \le \pi$
giving your answers as multiples of π.

(2) Solve the equation $6\tan^2\theta = 2 - 4\tan\theta$, $-\pi < \theta < \pi$ giving your answers in radians. Give any non-exact answers to 3 significant figures.

(3) Solve the equation
$4\cos^2(x) + 5\sin(x) - 5 = 0$, $0 \le x \le 2\pi$
Give your answers in radians. Give any non-exact values to 3 S.F