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A LEVEL MATHS

(36) Double Angle Formula cos 2A, sin 2A and tan 2A

WORKING AT D/E

(1) Use the formula book to show that

$$\sin(2A) \equiv 2\sin A\cos A$$

(2) Use the formula book to show that $\cos(2\theta)$ can be written as:

(a) $\cos^2\theta - \sin^2\theta$

(b) $2\cos^2\theta - 1$

(c) $1 - 2\sin^2\theta$

(3) Prove that $\cos(2\theta) + \cos^2\theta + \sin^2\theta \equiv 2\cos^2\theta$

WORKING AT B/C

(1) Given that $x = \cos 2\theta$ $y = \sin\theta$, show that $2y^2 + x = 1$

(2) (a) Prove that

$$\frac{2\sin x\cos x}{\cos^2 x - \sin^2 x} \equiv \tan 2x$$

(b) Hence, solve $\frac{2\sin x\cos x}{\cos^2 x - \sin^2 x} = 1$ for $0 < x < \pi$ giving your answers in terms of π.

(3) Solve the equation

$$\cos 2x + \cos x = 0, \quad 0 \le x \le 360$$

WORKING AT A*/A

(1) (a) Prove that

$$\tan 3x = \frac{3\tan x - \tan^3 x}{1 - 3\tan^2 x}$$

(b) Hence, solve the equation

$$\frac{3\tan 2y - \tan^3 2y}{1 - 3\tan^2 2y} = \sqrt{3},\ 0 < y < 90$$

(2) Given that A is an acute angle and $\cos 2A = \frac{1}{3}$ find an expression for:

(a) $\sin A$

(b) $\cos A$

(c) $\sin 2A$

(d) $\cot 2A$

(3) (a) Solve the equation

$$\sin 2y = \tan y, \quad 0 \le y \le 360$$

(a) Solve the equation

$2\cos^2\frac{\theta}{2} = \sin\theta + 1 \qquad 0 < \theta < 2\pi$

giving your answers in exact form