Air maths tuition

Interact, engage and perform

Trigonometry: sin 3θ in terms of sin θ

Express $\sin 3\theta$ in terms of $\sin\theta$

$\sin(A+B) \equiv \sin A\cos B + \sin B\cos A$

$\sin 2A \equiv 2\sin A\cos A$

$\cos 2A \equiv 1 - 2\sin^2 A$

$\sin^2 A + \cos^2 A \equiv 1$

$$\sin 3\theta \equiv \sin(2\theta + \theta)$$
$$\equiv \sin 2\theta\cos\theta + \sin\theta\cos 2\theta$$
$$\equiv (2\sin\theta\cos\theta)\cos\theta + \sin\theta(1 - 2\sin^2\theta)$$
$$\equiv 2\sin\theta\cos^2\theta + \sin\theta - 2\sin^3\theta$$
$$\equiv 2\sin\theta(1 - \sin^2\theta) + \sin\theta - 2\sin^3\theta$$
$$\equiv 2\sin\theta - 2\sin^3\theta + \sin\theta - 2\sin^3\theta$$
$$\equiv 3\sin\theta - 4\sin^3\theta$$

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