

1D Using de Moivre to Prove Trigonometric Identities

1. Express $\cos 3\theta$ using powers of $\cos \theta$.

2. Use De Moivre's theorem to show that:

$$\cos 6\theta = 32\cos^6\theta - 48\cos^4\theta + 18\cos^2\theta - 1$$

Further notes:

$$z + \frac{1}{z}$$

$$z - \frac{1}{z}$$

$$z^n + \frac{1}{z^n}$$

$$z^n - \frac{1}{z^n}$$

3. Express $\cos^5\theta$ in the form $a\cos5\theta + b\cos3\theta + c\cos\theta$

Where **a**, **b** and **c** are constants to be found.

4.

a) Express $\sin^4\theta$ in the form:

$$d\cos 4\theta + e\cos 2\theta + f$$

b) Hence, find the exact value of the following integral:

$$\int_0^{\frac{\pi}{2}} \sin^4\theta \, d\theta$$