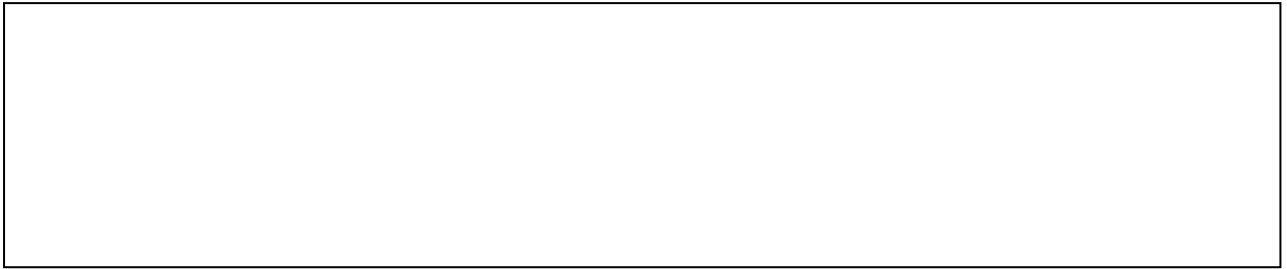


## De Moivre's Theorem



### Example

Prove by induction that  $z^n = r^n(\cos n\theta + i \sin n\theta)$

## De Moivre's Theorem: Exponential Form

### Examples

1. Simplify  $\frac{\left(\cos\frac{9\pi}{17} + i \sin\frac{9\pi}{17}\right)^5}{\left(\cos\frac{2\pi}{17} - i \sin\frac{2\pi}{17}\right)^3}$

2. Express  $(1 + \sqrt{3}i)^7$  in the form  $x + iy$  where  $x, y \in \mathbb{R}$ .

Test your understanding

$$z = -8 + (8\sqrt{3})i$$

(a) Find the modulus of  $z$  and the argument of  $z$ . **(3)**

Using de Moivre's theorem,

(b) find  $z^3$ , **(2)**