Modulus-Argument Form

$Im[z]$

r

y

θ

x

$Re[z]$
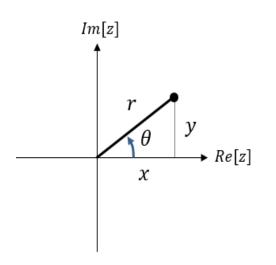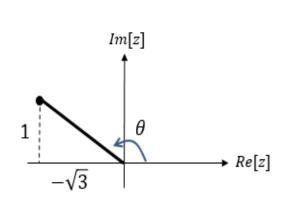
If we let $r = |z|$ and $\theta = \arg(z)$, can you think of a way of expressing z in terms of just r and θ?
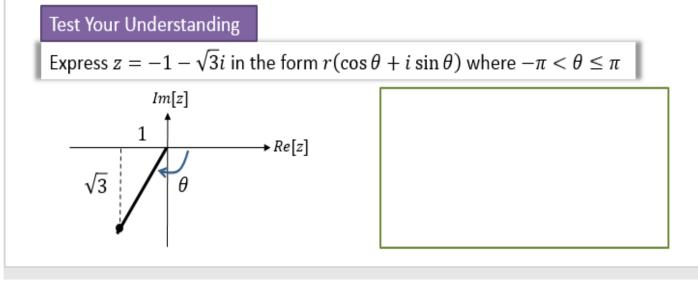
Context: (r, θ) is known as a polar coordinate and you learn about these in Core Pure Year 2. Instead of coordinates being specified by their x and y position (known as a Cartesian coordinate), they are specified by their distance from the origin (the 'pole') and their rotation.

Example

Express $z = -\sqrt{3} + i$ in the form $r(\cos\theta + i\sin\theta)$ where $-\pi < \theta \leq \pi$

Test Your Understanding

Express $z = -1 - \sqrt{3}i$ in the form $r(\cos\theta + i\sin\theta)$ where $-\pi < \theta \leq \pi$

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