Modulus of a complex number and radians

Starter

N.B. The ***modulus*** of a complex number is its ***distance from the origin*** on the Argand plane.

1. Find the modulus of these complex numbers: (a) $5 + 12\text{i}$ (b) $-2 + 3\text{i}$

N.B. ***Radians*** are a different unit of measurement for angles. It is important because all complex numbers and calculus with trigonometric functions is done with radians.

2. One radian is defined as the angle subtended at the centre of the circle such that the ***arc length is the same length as the radius***. How many degrees is one radian?

Notes

Modulus of a complex number

Notation The modulus of the complex number z is denoted by $|z|$.
We also we the letter r to denote the modulus i.e. $r = |z|$

Calculating the modulus

Let $z = x + y\text{i}$, then $|z| = r = \sqrt{x^2 + y^2}$.

Radian measure for angles

We found from the starter that 1 radian is approximately 57.3^o.

Notation 1 radian is denoted 1^c.
If we say an angle is $\frac{\pi}{3}$ ("pi by 3", not "pi over 3"), we do not use the $^\text{c}$ notation because it is obvious it is in radians.

Converting degrees to radians and vice versa

Degrees to radians: $\times \frac{\pi}{180}$

Radians to degrees: $\times \frac{180}{\pi}$

Degrees $\overset{\times \frac{\pi}{180}}{\underset{\times \frac{180}{\pi}}{\rightleftarrows}}$ **Radians**

E.g. 1 Common angles — copy and complete the table below.

Degress	0^o	30^o	45^o	60^o	90^o	120^o	135^o	150^o	180^o	270^o	360^o
Radians											

E.g. 2 Express the angles: (a) 72^o (b) 240^o as radians in terms of π:

E.g. 3 Calculate, to 3 s.f., radian approximations to the angles: (a) 37^o (b) 230^o

Video: Radians
Video: Modulus and argument of complex numbers

Solutions to Starter and E.g.s

Exercise
p123 4D Qu 1i, 2i, 3i (radians)

Summary

If $z = x + y\text{i}$, then $|z| = r = \sqrt{x^2 + y^2}$.

$1^c \approx 57.3^o$

Degrees to radians: $\times \frac{\pi}{180}$

Radians to degrees: $\times \frac{180}{\pi}$