Chapter 10 / **Example 2**

Cartesian and polar form

Write the following complex numbers in polar form:

a $4\sqrt{3}+4\text{i}$ **b** $-2+3\text{i}$ **c** $-12-5\text{i}$ **d** $4-2\text{i}$

Open a new document and add a Calculator page.

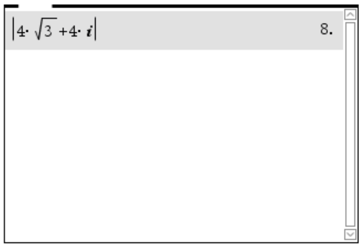
Find the modulus and argument of $4\sqrt{3}+4\text{i}$.

Enter the modulus function by pressing the template key and selecting $|\square|$ with the trackpad.

Type $4\sqrt{3}+4\text{i}$ and press enter.

To enter i press π▸ and select ***i*** from the menu.

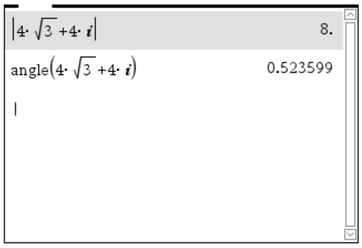
The modulus is 8.



Press menu 2:Number | 9:Complex Number Tools | 4:Polar Angle

Type $4\sqrt{3}+4\text{i}$ and press enter.

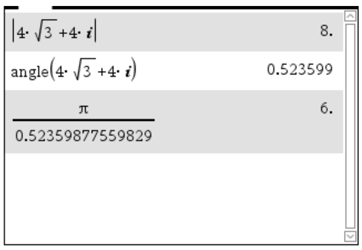
The argument is 0.524.



To find the argument in terms of π, type π ÷ ctrl (−) ans and press enter.

The result is 6, so the argument is $\frac{\pi}{6}$.

Hence $4\sqrt{3}+4\text{i}=8\text{e}^{\frac{\pi}{6}\text{i}}=8\,\text{cis}\frac{\pi}{6}$.

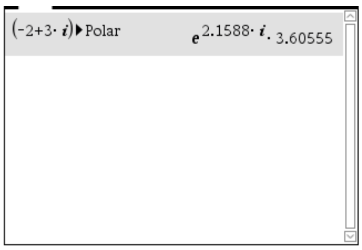


The TI-Nspire will find polar form directly.

Type $-2+3\text{i}$.

Press menu 2:Number | 9:Complex Number Tools | 6:Convert to Polar and press enter.

$-2+3\text{i}=3.61\text{e}^{2.16\text{i}}=3.61\,\text{cis}\,2.16$.



Chapter 10 / **Example 2**

Cartesian and polar form

If the document is set in degrees, the GDC displays the result in a different way.

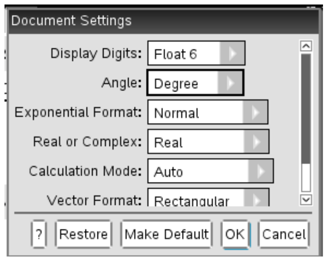
Use the touchpad to click on the wheel icon in the page header.

Select 2:Document Settings…

Select 'Degree' as the unit for Angle.

Use the touchpad to select OK or click enter.

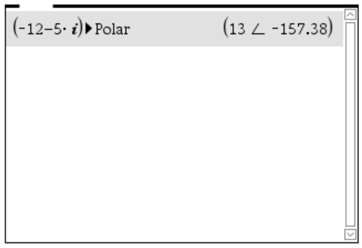
The page header should now show 'DEG'.



Type $-12-5i$.

Press menu 2:Number | 9:Complex Number Tools | 6:Convert to Polar and press enter.

The modulus of $-12-5i$ is 13 and its argument is −157°.



So, to convert a complex number from Cartesian to polar form, ensure that the GDC is in radian mode.

Type $4-2i$.

Press menu 2:Number | 9:Complex Number Tools | 6:Convert to Polar and press enter.

$4-2i = 4.47e^{-0.464i} = 4.47 cis -0.464$.

The GDC will choose a principal value of the argument in the interval $]\pi,\pi]$ but some authors use $[0,2\pi[$.