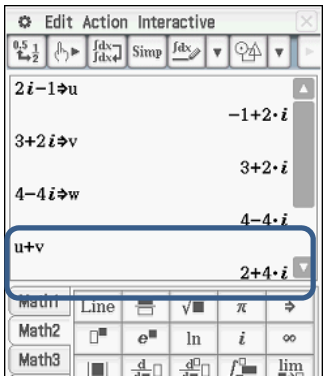
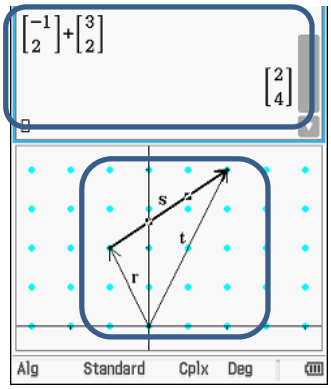
Activity 39 Picturing complex numbers

Aim: Represent complex numbers as points on the complex plane.
Note the similarities between adding complex numbers and vector addition.

1. Solve for z in the complex number equations and $\mathbf{x}$ in the vector equations.

	Use the complex numbers $u = 2i - 1$, $v = 3 + 2i$ and $w = 4 - 4i$ to solve for z	Use a vector diagram to solve for $\mathbf{x}$ with the vectors: $a = [-1, 2], b = [3, 2]$ and $c = [4, -4]$.
Example	$u + v = z$  $z = 2 + 4i$	$\mathbf{a} + \mathbf{b} = \mathbf{x}$  $x = [2,\ 4]$
a)	$v + w = z$	$\mathbf{b} + \mathbf{c} = \mathbf{x}$
b)	$2u - w = z$	$2\mathbf{a} - \mathbf{c} = \mathbf{x}$
c)	$z + u = w$	$\mathbf{x} + \mathbf{a} = \mathbf{c}$

2. Describe the similarities between adding and subtracting complex numbers and adding and subtracting vectors.

3. Draw vector diagrams to show that:

   a) The sum of any complex number and its conjugate is real.
   I.e. $(a+bi)+(\overline{a+bi})$ is real.

   b) The difference between any complex number and its conjugate is purely imaginary.

Learning notes

Vector calculations

- In Main, open a Geometry half window
- Use the vector tool to draw a vector from the origin to the required co-ordinate
- Add another vector head to tail
- Vectors can be dragged into the Main screen for calculations. Alternatively the resultant vector can be drawn in Geometry and the components found around the corner ▸ in the Measurement bar