

## Argand Diagram

### Starter

1. **(Review of last lesson)** Express in the form  $a + bi$  where  $a$  and  $b$  are real:

(a)  $\frac{5+i}{i-3}$

(b)  $\frac{1}{1+2i} + \frac{1}{1-2i}$

**Working:**

$$\begin{aligned} \text{(a)} \quad \frac{5+i}{i-3} &= \frac{5+i}{-3+i} = \frac{5+i}{-3+i} \times \frac{-3-i}{-3-i} \\ &= \frac{5+i}{-15-5i-3i+1} \\ &= \frac{9+1}{-14-8i} \\ &= -\frac{10}{7} - \frac{4}{5}i = -\frac{1}{5}(7+4i) \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \frac{1}{1+2i} + \frac{1}{1-2i} &= \frac{1-2i+1+2i}{(1+2i)(1-2i)} \\ &= \frac{2}{5} \end{aligned}$$

2. **(Review of last lesson)**

Given that  $z = -1 + 3i$ , express  $z + \frac{2}{z}$  in the form  $a + bi$  where  $a$  and  $b$  are real.

**Working:**

$$\begin{aligned} z + \frac{2}{z} &= -1 + 3i + \frac{2}{-1+3i} \\ &= -1 + 3i + \frac{2}{-1+3i} \times \frac{-1-3i}{-1-3i} \\ &= -1 + 3i + \frac{1+9}{-2-6i} \\ &= -\frac{6}{5} - \frac{12}{5}i = -\frac{6}{5}(1-2i) \end{aligned}$$

**Video:** [Argand diagram](#)

[Solutions to Starter and E.g.s](#)

### Exercise

p121 4C Qu 1i, 2i, 3i (10 minutes)