Outcome 2 – Multiplying complex numbers

Worked Example:

Given $z = 2 - 6i$, and $w = 5 + 3i$, find

zw and w^2.

$zw = (2 - 6i)(5 + 3i)$

$= 10 + 6i - 30i + 18$

$= 28 - 24i$

$w^2 = (5 + 3i)^2$

$= 25 + 30i - 9$

$= 16 + 30i$

1. Square 1ˢᵗ term
2. Times and double
3. Square last term

Key Facts/Formulae:

i, the imaginary number, is defined as $i = \sqrt{-1}$

A complex number, z, is one that can be written in the form $a + bi$.

a is the real part b is the imaginary part

To add/subtract complex numbers;

- add/subtract the real parts
- add/subtract the imaginary parts

To multiply complex numbers;

- form and multiply out brackets

Essential knowledge!

$i^2 = -1$ $i^3 = -i$ $i^4 = 1$

Questions…

Let $v = 2 + i$, $w = 3 - 4i$, $t = 5 - 2i$ and $s = 1 + 6i$.

Find;

1. vw

2. ts

3. ws

4. v^2

5. t^2

6. w^3

Answers

1 $10 - 5i$

2 $17 + 28i$

3 $27 + 14i$

4 $3 + 4i$

5 $29 - 20i$

6 $59 - 112i$