Multiply Complex Numbers

CN05-V1 · storyboard · CN05 Multiply complex numbers. Read each picture with its sentences.

Picture 1

Multiply $(4+i)(-2+3i)$.

$$-8+12i-2i+3i^2 \quad \text{four products}$$

$$= -8+10i-3 \quad 3i^2=-3$$

$$= \boxed{-11+10i}$$

1. Multiply 4 plus i, times negative 2 plus 3 i.
2. Four products: 4 times negative 2 is negative 8, 4 times 3 i is 12 i, i times negative 2 is negative 2 i, and i times 3 i is 3 i squared.
3. Combine the i terms.
4. And i squared is negative 1, so 3 i squared is negative 3.
5. So the product is negative 11 plus 10 i.

Picture 2

Work out $(2+3i)^2$.

$$(2+3i)(2+3i) = 4+6i+6i+9i^2$$

$$= \boxed{-5+12i} \quad 9i^2 = -9$$

6. Work out 2 plus 3 i, squared.
7. Write it as a product: 4, plus 6 i, plus 6 i, plus 9 i squared.
8. 4 minus 9 is negative 5, and 6 i plus 6 i is 12 i: negative 5 plus 12 i.

Picture 3

Trap $(7-3i)(7+3i)$

$\times$ $49-9=40$

✓ $49+9=58$

9. Watch for the trap: 7 minus 3 i, times 7 plus 3 i, is not 40.
10. The i terms cancel, and negative 9 i squared is plus 9: the answer is 58.

Picture 4

Trap $(2+3i)^2$

$\times\ 4+9i^2=-5$

$\checkmark\ \ -5+12i$

11. Another trap: 2 plus 3 i, squared, is not just negative 5.
12. Don't forget the middle term, 12 i.