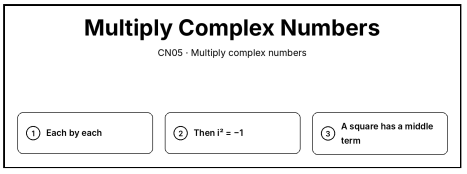
Multiply Complex Numbers: teacher script

CN05-V1 · CN05 Multiply complex numbers · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 88 seconds as a video.

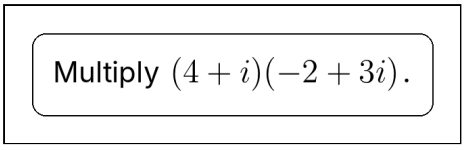
01



Say. Multiplying complex numbers. Multiply them like two binomials: each term by each term. Then replace i squared by negative 1. And remember, a square has a middle term.

Draw. Write the title “Multiply Complex Numbers” and the steps: 1. Each by each; 2. Then i² = −1; 3. A square has a middle term.

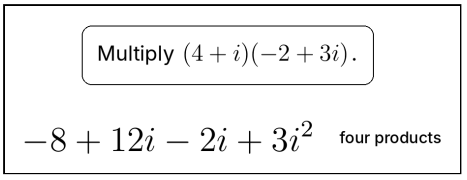
02



Say. Multiply 4 plus i, times negative 2 plus 3 i.

Draw. Clear the board. Write “Multiply (4 + i)(−2 + 3i).” in a box at the top.

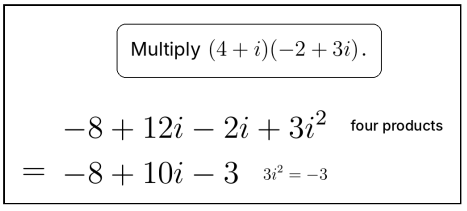
03



Say. 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.

Draw. Write −8 + 12i − 2i + 3i² on the next line. Beside it, write “four products”.

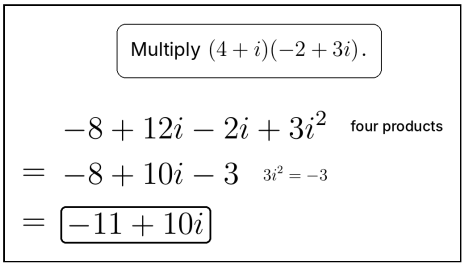
04



Say. Combine the i terms. And i squared is negative 1, so 3 i squared is negative 3.

Draw. Write = −8 + 10i − 3 on the next line. Beside it, write “3i² = −3”.

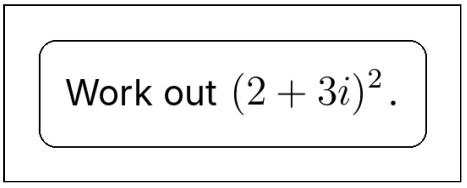
05



Say. So the product is negative 11 plus 10 i.

Draw. Write = −11 + 10i and box it on the next line.

06



Say. Work out 2 plus 3 i, squared.

Draw. Clear the board. Write “Work out (2 + 3i)².” in a box at the top.

07

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

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

Say. Write it as a product: 4, plus 6 i, plus 6 i, plus 9 i squared.

Draw. Write (2 + 3i)(2 + 3i) = 4 + 6i + 6i + 9i² on the next line.

08

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

$$(2+3i)(2+3i) = 4+6i+6i+9i^2$$
$$= \boxed{-5+12i} \quad 9i^2 = -9$$

Say. 4 minus 9 is negative 5, and 6 i plus 6 i is 12 i: negative 5 plus 12 i.

Draw. Write = −5 + 12i and box it on the next line. Beside it, write "9i² = −9".

09

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

$\times\ 49-9=40$

$\checkmark\ 49+9=58$

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

Draw. Clear the board. Write "Trap" and (7 − 3i)(7 + 3i). Below, write 49 − 9 = 40 and cross it out ×. Then write 49 + 9 = 58 with a tick ✓.

10

Trap $(2+3i)^2$

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

$\checkmark\ -5+12i$

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

Draw. Clear the board. Write "Trap" and (2 + 3i)². Below, write 4 + 9i² = −5 and cross it out ×. Then write −5 + 12i with a tick ✓.

11

Your turn

Each term by each term.

Then i² = −1.

Say. Now it is your turn. Multiply each term by each term, then replace i squared by negative 1, and combine the parts.

Draw. Point to today's activity: Each term by each term. Then i² = −1.