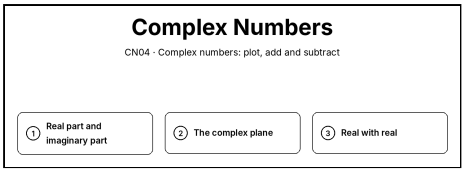
Complex Numbers: teacher script

CN04-V1 · CN04 Complex numbers: plot, add and subtract · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 105 seconds as a video.

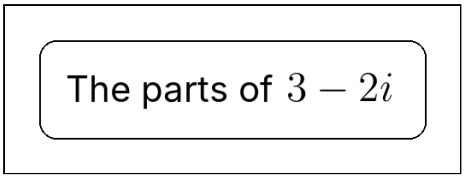
01



Say. Complex numbers. A real number plus an imaginary number, like 3 minus 2 i, is a complex number. It has a real part, 3, and an imaginary part, negative 2. We can draw it on the complex plane. And to add, combine real with real and imaginary with imaginary.

Draw. Write the title “Complex Numbers” and the steps: 1. Real part and imaginary part; 2. The complex plane; 3. Real with real.

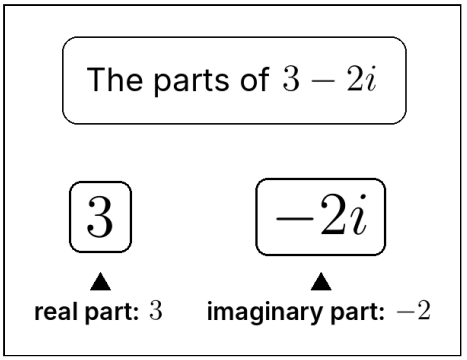
02



Say. Look at the parts of 3 minus 2 i.

Draw. Clear the board. Write “The parts of 3 − 2i” in a box at the top.

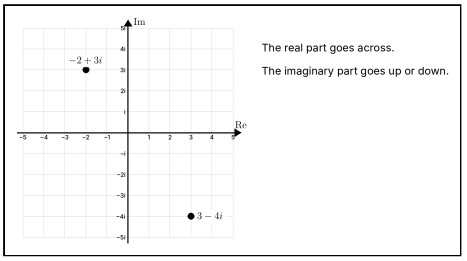
03



Say. The real part is 3, and the imaginary part is negative 2: the number in front of i, with its sign, but without the i.

Draw. Write 3 −2i, with a box round each term. Under 3, draw an arrow and write “real part: 3”. Under −2i, draw an arrow and write “imaginary part: −2”.

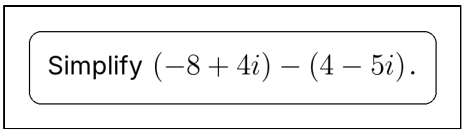
04



Say. On the complex plane, the real part goes across, along the real axis, and the imaginary part goes up or down. 3 minus 4 i is 3 right and 4 down. Negative 2 plus 3 i is 2 left and 3 up.

Draw. Clear the board and draw the complex plane, the real axis across and the imaginary axis up, from -5 to 5. Mark 3 − 4i at 3 across and -4 up or down. Mark −2 + 3i at -2 across and 3 up or down. Beside the grid, write “The real part goes across.”. Beside the grid, write “The imaginary part goes up or down.”.

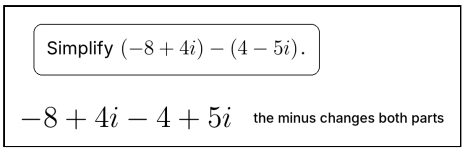
05



Say. Simplify negative 8 plus 4 i, minus, 4 minus 5 i.

Draw. Clear the board. Write “Simplify (−8 + 4i) − (4 − 5i).” in a box at the top.

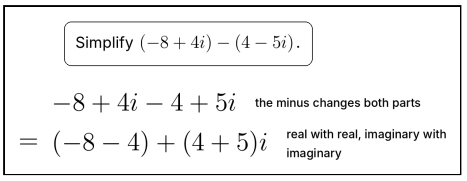
06



Say. The minus sign changes both parts of the bracket: minus 4, and plus 5 i.

Draw. Write −8 + 4i − 4 + 5i on the next line. Beside it, write “the minus changes both parts”.

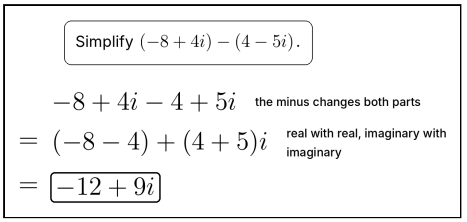
07



Say. Real with real, and imaginary with imaginary.

Draw. Write = (−8 − 4) + (4 + 5)i on the next line. Beside it, write “real with real, imaginary with imaginary”.

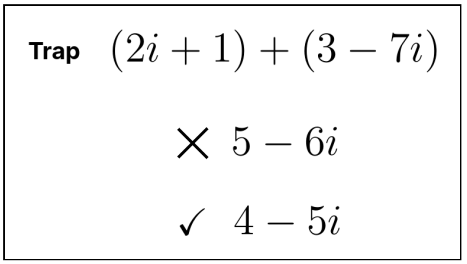
08



Say. That gives negative 12 plus 9 i.

Draw. Write = −12 + 9i and box it on the next line.

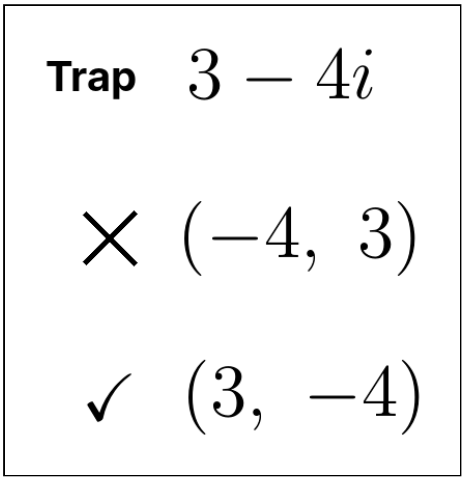
09



Say. Watch for the trap: 2 i plus 1, plus 3 minus 7 i, is not 5 minus 6 i. Real with real: 1 plus 3 is 4. Imaginary with imaginary: 2 i minus 7 i is negative 5 i. Writing the real part first helps.

Draw. Clear the board. Write “Trap” and (2i + 1) + (3 − 7i). Below, write 5 − 6i and cross it out ×. Then write 4 − 5i with a tick ✓.

10



Say. Another trap: 3 minus 4 i is not the point negative 4, 3. The real part first, across: it is the point 3, negative 4.

Draw. Clear the board. Write “Trap” and 3 − 4i. Below, write (−4,\ 3) and cross it out ×. Then write (3,\ −4) with a tick ✓.

11

Your turn

Real part across, imaginary part up.
Real with real, imaginary with imaginary.

Say. Now it is your turn. On the plane, the real part goes across and the imaginary part up. To add or subtract, combine real with real, and imaginary with imaginary.

Draw. Point to today’s activity: Real part across, imaginary part up. Real with real, imaginary with imaginary.