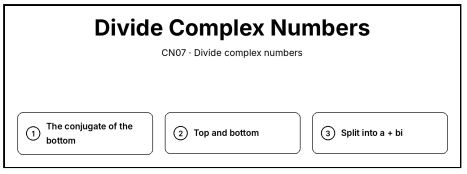
Divide Complex Numbers: teacher script

CN07-V1 · CN07 Divide complex numbers · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 82 seconds as a video.

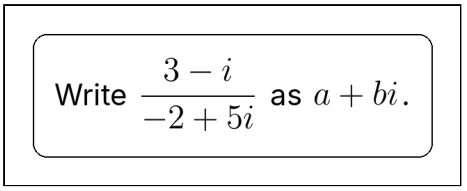
01



Say. Dividing complex numbers. Find the conjugate of the bottom. Multiply the top and the bottom by it, and the bottom becomes a real number. Then split the answer into a real part and an imaginary part.

Draw. Write the title “Divide Complex Numbers” and the steps: 1. The conjugate of the bottom; 2. Top and bottom; 3. Split into a + bi.

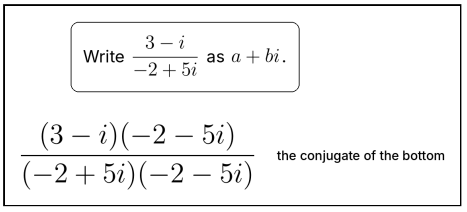
02



Say. Write 3 minus i, over negative 2 plus 5 i, as a plus b i.

Draw. Clear the board. Write “Write (3 − i)/(−2 + 5i) as a + bi.” in a box at the top.

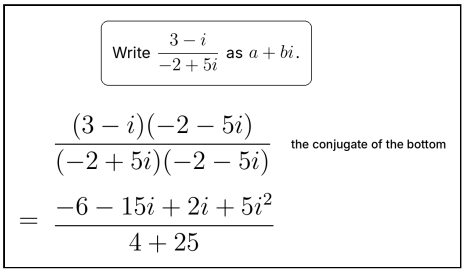
03



Say. The conjugate of the bottom is negative 2 minus 5 i. Multiply the top and the bottom by it.

Draw. Write ((3 − i)(−2 − 5i))/((−2 + 5i)(−2 − 5i)) on the next line. Beside it, write “the conjugate of the bottom”.

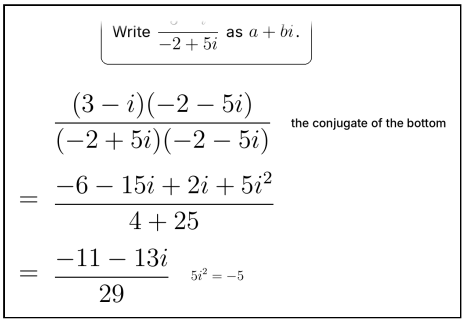
04



Say. The bottom is 4 plus 25, which is 29. The top is four products.

Draw. Write = (−6 − 15i + 2i + 5i²)/(4 + 25) on the next line.

05



Say. 5 i squared is negative 5, so the top is negative 11 minus 13 i.

Draw. Write = (−11 − 13i)/29 on the next line. Beside it, write “5i² = −5”.

06

$$\frac{(3-i)(-2-5i)}{(-2+5i)(-2-5i)} \quad \text{the conjugate of the bottom}$$
$$= \frac{-6-15i+2i+5i^2}{4+25}$$
$$= \frac{-11-13i}{29} \quad 5i^2=-5$$
$$= \boxed{-\tfrac{11}{29}-\tfrac{13}{29}i} \quad \text{split it}$$

Say. Split it: negative 11 over 29, minus 13 over 29 i.

Draw. Write = −11/29 − 13/29i and box it on the next line. Beside it, write “split it”.

07

Write $\frac{1}{i}$ as $a+bi$.

Say. Write 1 over i as a plus b i.

Draw. Clear the board. Write “Write 1/i as a + bi.” in a box at the top.

08

Write $\frac{1}{i}$ as $a+bi$.

$$\boxed{\frac{1}{i}=\frac{i}{i^2}=\frac{i}{-1}=-i}$$

Say. Multiply the top and the bottom by i: i over i squared, which is i over negative 1. So 1 over i is negative i.

Draw. Write 1/i = i/i² = i/(−1) = −i and box it on the next line.

09

Trap $\frac{6+4i}{2+2i}$

$\times\ 3+2i$

$\checkmark\ \frac{5}{2}-\frac{1}{2}i$

Say. Watch for the trap: 6 plus 4 i, over 2 plus 2 i, is not 3 plus 2 i. You can't divide part by part: multiply by the conjugate, and it comes to 5 halves minus one half i.

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

10

Your turn

Top and bottom by the conjugate of the bottom.
Then split into a + bi.

Say. Now it is your turn. Multiply the top and the bottom by the conjugate of the bottom, then split the answer into a plus b i.

Draw. Point to today’s activity: Top and bottom by the conjugate of the bottom. Then split into a + bi.