Divide Complex Numbers

CN07-V1 · storyboard · CN07 Divide complex numbers. Read each picture with its sentences.

Picture 1

$$\frac{(3-i)(-2-5i)}{(-2+5i)(-2-5i)}$$ the conjugate of the bottom

$$= \frac{-6-15i+2i+5i^2}{4+25}$$

$$= \frac{-11-13i}{29} \quad 5i^2 = -5$$

$$= \boxed{-\frac{11}{29} - \frac{13}{29}i}$$ split it

1. Write 3 minus i, over negative 2 plus 5 i, as a plus b i.
2. The conjugate of the bottom is negative 2 minus 5 i.
3. Multiply the top and the bottom by it.
4. The bottom is 4 plus 25, which is 29.
5. The top is four products.
6. 5 i squared is negative 5, so the top is negative 11 minus 13 i.
7. Split it: negative 11 over 29, minus 13 over 29 i.

Picture 2

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

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

8. Write 1 over i as a plus b i.
9. Multiply the top and the bottom by i: i over i squared, which is i over negative 1.
10. So 1 over i is negative i.

Picture 3

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

$\times\ 3+2i$

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

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