Answer key

The method: Dividing complex numbers

Multiply the top and the bottom by the conjugate of the bottom (a + bi becomes a − bi). Write the answer as a + bi.

$$\frac{8 - 12i}{-4i} = \frac{(8 - 12i)(4i)}{(-4i)(4i)}$$ multiply the top and the bottom by the conjugate, 4i

$$\frac{(8 - 12i)(4i)}{(-4i)(4i)} = \frac{32i - 48i^2}{16} = \frac{48 + 32i}{16} = 3 + 2i$$

the bottom is $(-4)^2 = 16$; divide both parts by 16

$$\frac{-9 + 2i}{1 + 2i} = \frac{(-9 + 2i)(1 - 2i)}{(1 + 2i)(1 - 2i)}$$ multiply the top and the bottom by the conjugate, 1 − 2i

$$\frac{(-9 + 2i)(1 - 2i)}{(1 + 2i)(1 - 2i)} = \frac{-9 + 18i + 2i - 4i^2}{5} = \frac{-5 + 20i}{5} = -1 + 4i$$

the bottom is $1^2 + 2^2 = 5$; divide both parts by 5

Problems 1 and 2 worked out · Version 0A

$$\frac{40 - 13i}{2 - 5i} = \frac{(40 - 13i)(2 + 5i)}{(2 - 5i)(2 + 5i)}$$ multiply the top and the bottom by the conjugate, 2 + 5i

$$\frac{(40 - 13i)(2 + 5i)}{(2 - 5i)(2 + 5i)} = \frac{80 + 200i - 26i - 65i^2}{29} = \frac{145 + 174i}{29} = 5 + 6i$$

the bottom is $2^2 + (-5)^2 = 29$; divide both parts by 29

$$\frac{30 - 25i}{5i} = \frac{(30 - 25i)(-5i)}{(5i)(-5i)}$$ multiply the top and the bottom by the conjugate, −5i

$$\frac{(30 - 25i)(-5i)}{(5i)(-5i)} = \frac{-150i + 125i^2}{25} = \frac{-125 - 150i}{25} = -5 - 6i$$

the bottom is $5^2 = 25$; divide both parts by 25

Dividing complex numbers · Version 0A

1) 5 + 6i 2) −5 − 6i 3) 2 + 4i 4) 3 − i 5) −2 + i
6) −5 − 4i 7) 4 − 5i 8) −5 + 2i 9) 5 + 4i
10) −2 + 4i 11) 5 − 3i 12) −1 − 6i 13) 6 − i
14) 3 − 6i 15) 5 + i 16) 4 − 6i 17) −4 − 4i
18) 3 + 6i 19) −3 + i 20) 4 + 6i 21) 6 − 2i
22) 1 + 6i 23) 4 + 4i 24) 5 − 4i 25) −5 + 4i
26) 1 + 6i 27) 1 − 6i 28) 2 − 5i 29) 1 − i
30) −5 − 4i