Questions: Arithmetic on complex numbers

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Summary

A selection of questions for the study guide on arithmetic on complex numbers.

*Before attempting these questions, it is highly recommended that you read* [*Guide: Arithmetic on complex numbers*](../studyguides/arithmeticoncomplexnumbers.qmd)*.*

## Q1

Work out each of the following expressions, expressing your answer in the form $a+bi$ where $a$ is the real part and $b$ is the imaginary part.

1.1. $ \left(5+7i\right)−\left(2+3i\right)$

1.2. $ \left(8+6i\right)+\left(2−4i\right)$

1.3. $ \left(4−i\sqrt{2}\right)−\left(3+i\sqrt{7}\right)$

1.4. $ \left(\sqrt{8}+4i\right)−\left(\sqrt{5}+2i\right)$

1.5. $ \left(\sqrt{7}+3i\right)+\left(2−i\right)$

1.6. $ \left(5+i\sqrt{2}\right)−\left(7−i\right)+\left(\sqrt{3}+4i\right)$

## Q2

Work out each of the following expressions, expressing your answer in the form $a+bi$ where $a$ is the real part and $b$ is the imaginary part.

2.1. $ \left(2+3i\right)\left(4+5i\right)$

2.2. $ \left(3+i\right)\left(2−i\right)$

2.3. $ 4\left(6+3i\right)$

2.4. $ \left(1+i\right)^{2}$

2.5. $ \left(3+2i\right)^{3}$

2.6. $ \left(7−4i\right)^{2}\left(i−2\right)$

2.7. $ \left(1−i\sqrt{3}\right)^{3}$

2.8. $ \left(5−2i\right)\left(5+2i\right)$

2.9. $ \left(\sqrt{2}+i\sqrt{3}\right)\left(\sqrt{8}−i\sqrt{3}\right)$

## Q3

Work out each of the following expressions, expressing your answer in the form $a+bi$ where $a$ is the real part and $b$ is the imaginary part.

3.1. $ \frac{7−6i}{1+2i}$

3.2. $ \frac{4−i}{1+4i}$

3.3. $ \frac{3}{5i}$

3.4. $ \frac{4+2i}{3−i}$

3.5. $ \frac{9+i}{i}$

3.6. $ \frac{−2−2i}{−2+2i}$

3.7. $ \frac{1+5i}{−3i}$

3.8. $ \frac{−4}{1−i}$

3.9. $ \frac{1−3i}{1+2i}$

## Q4

Work out each of the following expressions, expressing your answer in the form $a+bi$ where $a$ is the real part and $b$ is the imaginary part.

4.1. $ \frac{\left(6+4i\right)\left(3−i\right)}{2i}$

4.2. $ 3i\left(5−4i\right)+\left(6+2i\right)$

4.3. $ \left(2+3i\right)\left(1−i\right)−\left(5−4i\right)$

4.4. $ \frac{\left(5+2i\right)+\left(4−i\right)}{1+i}$

4.5. $ \frac{\left(2+i\right)^{3}}{\left(3+i\right)−\left(1+i\right)}$

4.6. $ \left(\frac{6−3i}{2\left(1−i\right)}\right)^{2}$

[After attempting the questions above, please click this link to find the answers.](../answers/as-arithmeticoncomplexnumbers.qmd)

## Version history and licensing

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