

Answers: Arithmetic on complex numbers

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Summary

Answers to questions relating to the guide on arithmetic on complex numbers.

These are the answers to [Questions: Arithmetic on complex numbers](#).

Please attempt the questions before reading these answers!

Q1

- 1.1. $(5 + 7i) - (2 + 3i) = 3 + 4i$
- 1.2. $(8 + 6i) + (2 - 4i) = 10 + 2i$
- 1.3. $(4 - i\sqrt{2}) - (3 + i\sqrt{7}) = 1 - (\sqrt{2} + \sqrt{7})i$
- 1.4. $(\sqrt{8} + 4i) - (\sqrt{5} + 2i) = (2\sqrt{2} - \sqrt{5}) + 2i$
- 1.5. $(\sqrt{7} + 3i) + (2 - i) = (\sqrt{7} + 2) + 2i$
- 1.6. $(5 + i\sqrt{2}) - (7 - i) + (\sqrt{3} + 4i) = (\sqrt{3} - 2) + (\sqrt{2} + 5)i$

Q2

- 2.1. $(2 + 3i)(4 + 5i) = -7 + 22i$
- 2.2. $(3 + i)(2 - i) = 7 - i$
- 2.3. $4(6 + 3i) = 24 + 12i$
- 2.4. $(1 + i)^2 = 0 + 2i = 2i$
- 2.5. $(3 + 2i)^3 = -9 + 46i$
- 2.6. $(7 - 4i)^2(i - 2) = -10 + 145i$
- 2.7. $(1 - i\sqrt{3})^3 = -8 + 0i = -8$
- 2.8. $(5 - 2i)(5 + 2i) = 29 + 0i = 29$
- 2.9. $(\sqrt{2} + i\sqrt{3})(\sqrt{8} - i\sqrt{3}) = 7 + i\sqrt{6}$

Q3

$$3.1. \frac{7 - 6i}{1 + 2i} = -1 - 4i$$

$$3.2. \frac{4 - i}{1 + 4i} = 0 - i = -i$$

$$3.3. \frac{3}{5i} = 0 - \frac{3}{5}i = -\frac{3}{5}i$$

$$3.4. \frac{4 + 2i}{3 - i} = 1 + i$$

$$3.5. \frac{9 + i}{i} = 1 - 9i$$

$$3.6. \frac{-2 - 2i}{-2 + 2i} = 0 + i = i$$

$$3.7. \frac{1 + 5i}{-3i} = -\frac{5}{3} + \frac{1}{3}i$$

$$3.8. \frac{-4}{1 - i} = -2 - 2i$$

$$3.9. \frac{1 - 3i}{1 + 2i} = -1 - i$$

Q4

$$4.1. \frac{(6 + 4i)(3 - i)}{2i} = 3 - 11i$$

$$4.2. 3i(5 - 4i) + (6 + 2i) = 18 + 17i$$

$$4.3. (2 + 3i)(1 - i) - (5 - 4i) = 0 + 5i = 5i$$

$$4.4. \frac{(5 + 2i) + (4 - i)}{1 + i} = 5 - 4i$$

$$4.5. \frac{(2 + i)^3}{(3 + i) - (1 + i)} = 1 + \frac{11}{2}i$$

$$4.6. \left(\frac{6 - 3i}{2(1 - i)}\right)^2 = \frac{9}{2} + \frac{27}{8}i$$

Version history and licensing

v1.0: initial version created 11/24 by Charlotte McCarthy as part of a University of St Andrews VIP project.

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