MCINTYRE MATHS · MATHEMATICS EXTENSION 2

Practice worksheet

Lesson 1 · The arithmetic of complex numbers

Name: _____ Date: _____

The number i and powers of i

1. Solve each equation.

(a) $x^2 + 16 = 0$ (b) $x^2 + 7 = 0$

(c) $9x^2 + 4 = 0$

2. Simplify.

(a) i^{12} (b) i^{27}

(c) i^{102} (d) i^{-1}

Number sets and parts

3. State the smallest set ($\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$ or $\mathbb{C}$) containing each number.

(a) $-\frac{3}{4}$ (b) $\sqrt{16}$

(c) $\sqrt{12}$ (d) $5i - 2$

(e) $\cos \pi$

4. Write down $\mathrm{Re}(z)$ and $\mathrm{Im}(z)$ for (a) $z = -5 + 2i$, (b) $z = 6i$, (c) $z = \frac{3-i}{4}$.

Arithmetic

5. Express in the form $a + ib$.

(a) $(5 - 2i) + (1 + 7i)$ (b) $(2 + 3i) - (6 - i)$

(c) $(4 + i)(2 - 3i)$ (d) $(1 - 2i)^2$

6. Find $\mathrm{Re}(z)$ and $\mathrm{Im}(z)$ if $z = (2 - i)(3 + 4i)$.

Adapted HSC-style

7. Let $z = 1 + i$. (a) Find z^2 and z^3 in the form $a + ib$. (b) Hence evaluate $z + z^2 + z^3$. (c) Find z^8.

