MCINTYRE MATHS · MATHEMATICS EXTENSION 2

Practice worksheet

Lesson 2 · Conjugates, division and equality

Name: _____ Date: _____

Conjugates and modulus

1. Find $\overline{z}$, $z\overline{z}$ and $|z|$ for (a) $z = 5 - 12i$, (b) $z = -\sqrt{3} + i$.

2. Let $z_1 = 2 - i$ and $z_2 = 4 + 3i$. Verify that $\overline{z_1 z_2} = \overline{z_1}\,\overline{z_2}$.

3. Prove that $\overline{z_1 - z_2} = \overline{z_1} - \overline{z_2}$.

Division

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

(a) $\dfrac{4}{i}$ (b) $\dfrac{2}{1+i}$

(c) $\dfrac{1+2i}{3-i}$ (d) $\dfrac{5+i}{2+3i}$

5. Use $\frac{1}{z} = \frac{\overline{z}}{|z|^2}$ to find $\frac{1}{z}$ when $z = -3 + 4i$.

Equality of complex numbers

6. Find real x and y such that $(x + iy)(1 + 2i) = 7 + 4i$.

7. Show that $z = \overline{z}$ if and only if z is real.

Adapted HSC-style

8. Let $z = 3 - 2i$ and $w = 1 + 4i$. (a) Express $\dfrac{w}{z}$ in the form $x + iy$. (b) Find real a and b such that $z + (a + ib)\overline{w} = 10 + i$.

