



Grade 9/10 Math Circles

November 24, 2021

Complex Numbers Lesson 2 - Problem Set

(The questions below are referenced as questions 1-4 in section 4.11)

1. Show that if $z = a + bi \neq 0$ then $z^{-1}z = 1$.
2. Given $z_1 = 4 + 3i$ and $z_2 = 5 - i$
 - (a) Determine z_2^{-1}
 - (b) Determine $z_1 z_2^{-1}$
 - (c) Determine $z_1 \div z_2$
 - (d) Explain why your answers for (b) and (c) are the same.
3. Evaluate each of the following.
 - (a) $(5 - 7i) + (6 + 5i)$
 - (b) $(3 + 4i) \times (11 - 9i)$
 - (c) $(3 + 2i) - (7 - 4i)$
 - (d) $(7 - 2i) \div (3 + i)$
4. Evaluate each of the following by expanding fully then using powers of i to simplify.
 - (a) $(1 + 2i)^3$
 - (b) $(2 - i)^4$