1.1 - 1.4 Homework Problems

(2.2b) Prove that $\mathrm{Im}(iz) = \mathrm{Re}\, z$.

(2.4) Solve the equation $z^2 - 2z + 2 = 0$.

(3.2) Prove that

$$(z^{-1})^{-1} = z \quad \text{when } (z \neq 0).$$

Note:

$$\frac{1}{\left(\frac{1}{z}\right)} = z$$

is the same statement in different notation. You can start your proof using either notation.

(3.4) Prove that if $z_1 z_2 z_3 = 0$, then at least one of the three factors is zero.

(4.A) Prove that $|z_1 + z_2| \geq |z_1| - |z_2|$ for every pair of complex numbers z_1 and z_2.

(4.4) Verify that $\sqrt{2}|z| \geq |\mathrm{Re}\, z| + |\mathrm{Im}\, z|$.

(4.5) Sketch the set of points determined by the given conditions.

(a) $|z - 1 + i| = 1$ (b) $|z + i| \leq 3$ (c) $|z - 4i| \geq 4$