

Exercise 2

Show that

$$(a) \operatorname{Re}(iz) = -\operatorname{Im} z;$$

$$(b) \operatorname{Im}(iz) = \operatorname{Re} z.$$

Solution

Part (a)

$$\begin{aligned}\operatorname{Re}(iz) &= \operatorname{Re}[i(x + iy)] \\ &= \operatorname{Re}(ix + i^2y) \\ &= \operatorname{Re}(-y + ix) \\ &= -y \\ &= -\operatorname{Im}(x + iy) \\ &= -\operatorname{Im} z\end{aligned}$$

Part (b)

$$\begin{aligned}\operatorname{Im}(iz) &= \operatorname{Im}[i(x + iy)] \\ &= \operatorname{Im}(ix + i^2y) \\ &= \operatorname{Im}(-y + ix) \\ &= x \\ &= \operatorname{Re}(x + iy) \\ &= \operatorname{Re} z\end{aligned}$$