

Exercise 1

Verify that

$$(a) \quad (\sqrt{2} - i) - i(1 - \sqrt{2}i) = -2i;$$

$$(b) \quad (2, -3)(-2, 1) = (-1, 8);$$

$$(c) \quad (3, 1)(3, -1) \left(\frac{1}{5}, \frac{1}{10} \right) = (2, 1).$$

Solution**Part (a)**

$$\begin{aligned}(\sqrt{2} - i) - i(1 - \sqrt{2}i) &= \sqrt{2} - i - i + \sqrt{2}i^2 \\ &= \sqrt{2} - 2i - \sqrt{2} \\ &= -2i\end{aligned}$$

Part (b)

$$\begin{aligned}(2, -3)(-2, 1) &= (2 - 3i)(-2 + i) \\ &= -4 + 2i + 6i - 3i^2 \\ &= -4 + 8i + 3 \\ &= -1 + 8i \\ &= (-1, 8)\end{aligned}$$

Part (c)

$$\begin{aligned}(3, 1)(3, -1) \left(\frac{1}{5}, \frac{1}{10} \right) &= (3 + i)(3 - i) \left(\frac{1}{5} + \frac{1}{10}i \right) \\ &= (9 - i^2) \left(\frac{1}{5} + \frac{1}{10}i \right) \\ &= 10 \left(\frac{1}{5} + \frac{1}{10}i \right) \\ &= 2 + i \\ &= (2, 1)\end{aligned}$$