

→ **Exercice 1 : 29 p. 246**

$$z_1 = 1 - 4i \text{ et } z_2 = 1 + i.$$

$$1. z_1 z_2 = (1 - 4i)(1 + i) = 1 - 4i^2 + i - 4i = 5 - 3i.$$

$$2. z_1^2 = (1 - 4i)^2 = 1^2 + (-4i)^2 - 8i = 17 - 8i.$$

$$3. z_2^3 = (1 + i)^3 = (1 + i)^2 \times (1 + i) = (1^2 + i^2 + 2i)(1 + i) = 2i(1 + i) = -2 + 2i.$$

$$4. \frac{z_2}{z_1} = \frac{1 + i}{1 - 4i} = \frac{(1 + i)(1 + 4i)}{(1 - 4i)(1 + 4i)} = \frac{1 + 4i^2 + i + 4i}{1 - (4i)^2} = \frac{-3 + 5i}{17} = \frac{-3}{17} + i \frac{5}{17}.$$

$$5. \frac{1}{z_1} - \frac{1}{z_2} = \frac{z_2}{z_1 z_2} - \frac{z_1}{z_1 z_2} = \frac{z_2 - z_1}{z_1 z_2} = \frac{(1 + i) - (1 - 4i)}{5 - 3i} = \frac{5i(5 + 3i)}{(5 - 3i)(5 + 3i)} = \frac{-15 + 25i}{25 + 9}$$
$$\frac{1}{z_1} - \frac{1}{z_2} = \frac{-15}{34} + i \frac{25}{34}.$$