

Exercise 4

Use property (4) of conjugates in Sec. 5 to show that

$$(a) \overline{z_1 z_2 z_3} = \overline{z_1} \overline{z_2} \overline{z_3}; \quad (b) \overline{z^4} = \overline{z}^4.$$

Solution

Part (a)

Use the associative property and apply property (4) twice.

$$\begin{aligned} \overline{z_1 z_2 z_3} &= \overline{(z_1 z_2) z_3} \\ &= \overline{z_1 z_2} \overline{z_3} \\ &= \overline{z_1} \overline{z_2} \overline{z_3} \end{aligned}$$

Part (b)

Use the associative property and apply property (4) twice.

$$\begin{aligned} \overline{z^4} &= \overline{(zz)(zz)} \\ &= \overline{zz} \overline{zz} \\ &= \overline{z} \overline{z} \overline{z} \overline{z} \\ &= \overline{z}^4 \end{aligned}$$