Exercise 4

Use property (4) of conjugates in Sec. 6 to show that

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

Solution

Property (4) in Sec. 6 is on page 15.

$$\overline{z_1 z_2} = \overline{z_1}\,\overline{z_2} \tag{4}$$

Part (a)

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

$$\overline{z_1 z_2 z_3} = \overline{(z_1 z_2) z_3}$$

$$= \overline{z_1 z_2}\,\overline{z_3}$$

$$= \overline{z_1}\,\overline{z_2}\,\overline{z_3}$$

Part (b)

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

$$\overline{z^4} = \overline{(zz)(zz)}$$

$$= \overline{zz}\,\overline{zz}$$

$$= \bar{z}\bar{z}\bar{z}\bar{z}$$

$$= \bar{z}^4$$