

3.44  
2

$$\textcircled{1} \quad z_1 = a+bi \quad z_2 = c+di \quad z_1 \cdot z_2 = (ac-bd) + i(ad+bc)$$

$$\bar{z}_1 = a-bi \quad \bar{z}_2 = c-di \quad \bar{z}_1 \cdot \bar{z}_2 = (ac-bd) + i(ad+bc)$$

$$\overline{z_1 \cdot z_2} = \bar{z}_1 \cdot \bar{z}_2$$

$$\textcircled{2} \quad z_1 = a+bi \quad z_2 = c+di \quad a^2+b^2 = c^2+d^2$$

$$\frac{z_1 - z_2}{z_1 + z_2} = \frac{(a-c) + i(b-d)}{(a+c) + i(b+d)} \cdot \frac{(a+c) - i(b+d)}{(a+c) - i(b+d)} =$$

$$= \frac{(a^2 - c^2 - b^2 + d^2) + i(-a-c)(b+d) + i(b-d)(a+c)}{(a+c)^2 + (b+d)^2} =$$

$$= \frac{i(-ab-ad+cb+cd+ba+bc-da-dc)}{(a+c)^2 + (b+d)^2} = \frac{i(-2ad+2cb)}{(a+c)^2 + (b+d)^2}$$

3.44  
29

אם  $z_1$  ו- $z_2$  הם איברים מרוכבים של  $\mathbb{C}$ , אז  $\overline{z_1 z_2} = \bar{z}_1 \bar{z}_2$  ו- $\overline{\frac{z_1}{z_2}} = \frac{\bar{z}_1}{\bar{z}_2}$

$$z_1 = 2-i \quad z_2 = 2+i \quad z_3 = -3 \quad \text{אם  $z_1, z_2, z_3$  הם איברים מרוכבים}$$

$$(z_1 - z_2 + i)(z_1 - z_2 - i)(z_1 + z_3) =$$

$$(z^2 - 2z - 2i - 2z + 4 + 2i + i z - 2i + 1)(z + 3) =$$

$$(z^2 - 4z + 5)(z + 3) = z^3 - 12z^2 + 3z^2 - 4z^2 + 5z + 15$$

$$= z^3 - z^2 - 7z + 15$$