Übungen in lin.Alg.+Geom. $\diamond$ E+M I / 14 $\diamond$

Probl. 1 $z = 3 + 4i$

(a) $\bar{z} = ?$, $z \cdot \bar{z} = ?$

(b) $|z| = ?$

(c) $z^2 = ?$

(d) $\dfrac{1}{z} = ?$

(e) $z = r\,cis(\varphi) = r\,e^{i\varphi}$, $r, \varphi = ?$

(f) $\dfrac{1}{|z|} = ?$

(g) $z \cdot \bar{z} = ?$

(h) $\dfrac{\bar{z}}{|z|^2} = ?$

(i) $|\bar{z}| = ?$

Probl. 2 $z_1 = 1 - i$, $z_2 = -1 + 2i$

(a) $z_1 \cdot z_2 = ?$

(b) $\dfrac{z_1}{z_2} = ?$

(c) $\left|\dfrac{z_1}{z_2}\right| = ?$

(d) $\dfrac{z_1 + z_2}{z_2} = ?$

(e) $\dfrac{3\,z_1 + 2\,z_2}{4\,z_2} = ?$

(f) $z_1^2 \cdot z_2^3 = ?$

Probl. 3 $z_1 = -1 - i$

(a) $z^2 = z_1 \rightsquigarrow z = ?$

(b) $z^3 = z_1 \rightsquigarrow z = ?$

(c) $z^4 = z_1 \rightsquigarrow z = ?$

(d) $z^5 = z_1 \rightsquigarrow z = ?$

Probl. 4 $x^2 + x + 1 = 0$, $x_{1,2} = ?$

Probl. 5 (a) $z_1 = 2 + i \Rightarrow z_1^2, z_1^3, z_1^4 = ?$ Skizze!

(b) $z_2 = \dfrac{1}{\sqrt{2}} \cdot (1 + i) \Rightarrow z_2^2, z_2^3, z_2^4 \ldots z_2^M = ?$ Skizze!