1. Find the roots of the following polynomials; show your work, recommended not to use a calculator!
   a) $z^2 + (2i - 7)z - 14i$
   b) $z^2 + (i + 8)z + 8i$
   c) $z^2 - (12i + 9)z + 108i$

2. Fisher 4.2.1

3. Fisher 4.2.2

4. Find the electrostatic potential $\phi$ between two infinite flat plates in the plane: one along the positive real axis, at $\phi_0 = 0$, and one starting at the origin and situated up and to the left, meeting the first plate at $120^\circ$, held at $\phi_1$. Note that there is a small insulator between the two plates at the origin!

5. Consider two non-concentric circles, one of which crosses the axis at $x = 1/7$ and $x = 1/2$ (with its center on the real axis), and one defined by $|z_2| = 1$. First show that the following map
   $$w = \frac{3z - 1}{3 - z}$$
   a) moves the inner circle to $|w_1| = 1/5$, and b) keeps the outer circle fixed ($|w_2| = 1$). Next find the electrostatic potential $\phi$ between the two original cylinders in the $z$-plane, with the inner one held fixed at $\phi_1 = 12$ V and the outer one held fixed at $\phi_2 = 40$ V.