1. Starting from the formula $e^{z_1}e^{z_2} = e^{z_1+z_2}$ for all complex numbers z_1 and z_2, and using the fact that $e^{i\theta} = \cos\theta + i\sin\theta$ for all $\theta \in \mathbb{R}$, show

$$\sin(\theta+\phi) = \sin(\theta)\cos(\phi) + \cos(\theta)\sin(\phi)$$
$$\cos(\theta+\phi) = \cos(\theta)\cos(\phi) - \sin(\theta)\sin(\phi).$$

2. Use the results of problem 1) to show that $SO(2)$ is a matrix group.

3. Text: 1.1.2

4. Text: 1.1.3

5. Derive the formulas $R_{\theta_1}R_{\theta_2} = R_{\theta_1+\theta_2}$ and $z_{\theta_1}z_{\theta_2} = z_{\theta_1+\theta_2}$.

6. Text: 1.2.3 (You'll want to read page 6 first)

7. Text: 1.2.4

8. Text: 1.2.5