Chapter 2 Problem Set Supplement: Part A

1. In the past we've noticed that some students are yet uncomfortable with complex numbers, especially moving from the real/imaginary notation ($z = x + jy$) and polar notation ($|z|e^{j\angle z}$). Give the following quantities in polar form:

   (a) $(1+j)^3$

   (b) $(\sqrt{3}+j^3)(1-j)$

   (c) $\frac{2-j(6/\sqrt{3})}{2+j(6/\sqrt{3})}$

   (d) $j(1+j)e^{j\pi/6}$

   (e) $\frac{e^{j\pi/3}-1}{1+j\sqrt{3}}$

2. Use Euler's relation ($e^{j\theta} = \cos(\theta) + j\sin(\theta)$) to show that:

   (a) $\sin(\theta)\sin(\phi) = \frac{1}{2}\cos(\theta-\phi) - \frac{1}{2}\cos(\theta+\phi)$

   (b) $\sin(\theta+\phi) = \sin(\theta)\cos(\phi) + \cos(\theta)\sin(\phi)$