

**<http://timmel.chem.ox.ac.uk/lectures/>**

**Complex Numbers**

1. Solve the following equations and show their solutions in an Argand Diagram:

(a)  $z^4 = 8(1 + i\sqrt{3})$

(b)  $z^3 + 1 = 0$

2. Which of the following numbers

a)  $z_1 = -2 + 3i$

b)  $z_2 = 1 - 2i$

c)  $z_3 = 3 + i$ .

are solutions of the equation

$$z^4 - 2z^3 - z^2 - 38z + 130 = 0 \quad ?$$

What are the other solutions of this equation?

3. For which numbers  $z = x + iy$  is the term  $w = z/(1+z^2)$  real?

4. Solve questions 8 and 13-19 in the problem booklet.

**Integration**

5. Solve questions 1-4 from the problem booklet.