MATHEMATICS 2 (MA10193)
EXAMPLES SHEET 3

I will look at work given to me after Easter. If you do not have a copy of this sheet, you can find one at
`http://www.bath.ac.uk/~masgks/MA10193/sheet3.ps` *(or* `.dvi` *or* `.pdf`*).*

1. Calculate $(7-2i)+(8+5i)$; $(3-i)(6+5i)$; $(3-i)/(6+5i)$; $(2+i)/i$; $\sqrt{-i}$.

2. Find the inverse of the matrix A given by

$$A = \begin{pmatrix} 0 & 2 & 1 \\ -1 & 3 & 2 \\ 2 & 1 & -1 \end{pmatrix}.$$

3. Let $z = 3+i$. Find z^2 in Cartesian form. Plot z and z^2 on an Argand diagram.

4. Let $z_1 = 1-2i$ and let $z_2 = 4+yi$ for some real number y. Determine the value of y if the real part of $z_1 z_2$ is zero. Determine the value of y if $\frac{z_1}{z_2}$ is a real number.

5. Consider the complex number $z = \sqrt{3}+i$. Calculate $|z|$, and $\arg z$ (in radians). What is the smallest positive integer n such that z^n is a real number?

6. Solve the equation $x^2-5x+32=0$. Hence find the eigenvalues of the matrix $\begin{pmatrix} 3 & 13 \\ -2 & 2 \end{pmatrix}$.

GKS, 18/03/05