

Course 414 2007-08**S h e e t 1**

Due: after the lecture next Thursday

Exercise 1

Prove that

$$\operatorname{Im}(iz) = \operatorname{Re}z, \quad \operatorname{Re}(iz) = -\operatorname{Im}z, \quad |\operatorname{Re}z| \leq |z|.$$

Exercise 2

Find $\log z$ and $\operatorname{Log} z$ for

- (i) $z = i$;
- (ii) $z = 1 + i$;
- (iii) $z = 2/(1 - \sqrt{3}i)$.

Exercise 3

- (i) Show that $\arg(z_1 z_2) = \arg z_1 + \arg z_2$ as sets.
- (ii) Show that $\operatorname{Arg}(z_1 z_2) = \operatorname{Arg} z_1 + \operatorname{Arg} z_2$ provided $-\pi < \operatorname{Arg} z_1 + \operatorname{Arg} z_2 \leq \pi$.
- (iii) Give an example of z_1, z_2 with $\operatorname{Arg}(z_1 z_2) \neq \operatorname{Arg} z_1 + \operatorname{Arg} z_2$.