

Ma 416: Complex Variables

Homework Assignment 1

Prof. Wickerhauser

Due Thursday, September 8th, 2005

1. Find the real parts, imaginary parts, and absolute values of the complex numbers

$$(a) \frac{i+1}{i-1} \quad (b) \frac{1}{(1+2i)(3i-4)}$$

2. Graph the sets of points described by each of the following formulas:

(a) $|z - i| \leq 2$

(b) $\operatorname{Im} z > 2 \operatorname{Re} z$

3. Find the absolute value and principal argument for the following expressions:

(a) $3[\cos(2\pi/3) + i \sin(2\pi/3)]$

(b) $(3 + 4i)/(5i - 12)$

4. Find an argument in the interval $[0, 2\pi)$ for the following expressions, valid for any complex number z :

(a) $z - \bar{z}$

(b) $z + \bar{z}$

(c) $z\bar{z}$

(d) z/\bar{z} , if $z \neq 0$

5. Simplify $(1 + i)^{17}$ into the form $a + bi$.

6. Find all complex numbers z satisfying the equation $|z|^2 = 2\bar{z}$.