

HOMEWORK 1, DUE FRIDAY, JANUARY 20

Please turn in solutions for the following problems:

(1) Let  $z = 1 - 2i$ , and  $w = -2 + i$ . Compute each of the following:

(a)  $z + 3w$

(b)  $w^2 - \bar{z}$

(c)  $\frac{5z}{2w}$

(d)  $z\bar{w}$

(e)  $\bar{z}w$

(f)  $2z - iw$

(g)  $z^2 - 4i\bar{z} + 3 - 2i$

(2) For each of the following complex numbers, give the polar or exponential form, using the principal argument.

(a)  $1 + i\sqrt{3}$

(b)  $-2 - 2i$

(c)  $\left(\frac{1+i}{\sqrt{2}}\right)^4$

(3) Write the complex number  $2e^{i\pi/4}$  in the form  $a + bi$ .

(4) Find all solutions of the equation  $(z + 1)^4 = 1 - i$ .

(5) Sketch the set of points in the complex plan determined by each of the following conditions:

(a)  $|z| = 3$

(b)  $|z - 2| = |z - i|$

(c)  $\operatorname{Re}[(1 - i)\bar{z}] = 0$

(6) Write the equation of the circle of radius 2 centered at  $4 + i$ .

In addition, I suggest that you work these problems from the Brown/Churchill textbook (but do not turn in):

- Page 5, problems 1, 2, 4
- Page 8, problems 1, 2
- Page 12, problem 5
- Pages 14-15, problems 1, 2, 7
- Pages 22-23, problems 1, 2, 5
- Pages 29-30, problems 2, 6