

HOMEWORK 1, DUE FRIDAY, JANUARY 24

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 $(z + 1)^4 = 1 - i$, leaving your answers in polar/exponential form if you wish.

(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