PHYS 308 – HOMEWORK # 7 – DUE MONDAY, 04/04/2011

1. Express the following complex numbers in the $x + iy$ form:

$$\frac{(i-\sqrt{3})^3}{1-i}, \qquad \left(\frac{1+i}{1-i}\right)^2, \qquad 4e^{-8i\pi/3}.$$

2. Find real x and y for which $|z+3| = 1 - iz$, where $z = x + iy$.

3. Show that $\mathrm{Re}(z) = (z+z^*)/2$ and that $\mathrm{Im}(z) = (1/2i)(z - z^*)$.

4. If $f(z) = 1 + iz$, is $f^*(z) = f(z^*)$?

5. Rewrite the following expression in the form $\mathrm{Re}(z) + i\mathrm{Im}(z)$:

$$\left|\frac{2e^{i\theta} - i}{ie^{i\theta} + 2}\right|.$$

Key

Unless otherwise specified, problems are from the course textbook:

F.W. Byron, R.W. Fuller
Mathematics of Classical and Quantum Physics
Dover Publications (1992)
ISBN-10: 048667164X, ISBN-13: 978-0486671642.

Problem X.Y p.Z means "Problem No. Y of Chapter X, page Z."

Example: Problem 1.3 p.39 = Problem No. 3 of Chapter 1, page 39.
