TOPICS in MATHEMATICAL PHYSICS

PHYS 324

Problem Set # 1
Distributed: January 9, 2014
Due: January 16, 2014

1. Write the following numbers in the form $a + bi$:

$(a) \quad (1 - i\sqrt{3})^3 \qquad (b) \quad \dfrac{(1+i)^2}{1-i} \qquad (c) \quad \dfrac{2 - i\sqrt{3}}{1+i} \qquad (d) \quad \dfrac{1+i}{2 - i\sqrt{3}}$

2. Ditto

$(a) \quad \sqrt{i} \qquad (b) \quad \sqrt{1-i} \qquad (c) \quad \dfrac{1}{\sqrt{1+i}} \qquad (d) \quad \dfrac{\sqrt{i}}{i} \qquad (e) \quad \sqrt{-i}$

3. $Re\left(\dfrac{d}{dt}e^{i\omega t}\right) =? \qquad \dfrac{d}{dt}Re\left(e^{i\omega t}\right) =?$

4. If $z = x + iy$, write these functions in the form $u(x,y) + iv(x,y)$:

$(a) \quad z^2 \qquad (b) \quad \dfrac{1}{z} \qquad (c) \quad \dfrac{1}{1-z} \qquad (d) \quad \dfrac{1}{z+i}$