Homework 2

MATH 420

Please email me your homework as a pdf file
All work must be shown clearly. You must justify all your answers.

1. Find the principal argument $\mathrm{Arg}(z)$ of

$$z = \frac{i}{-2-2i}$$

2. Put z in rectangular form (i.e. write as $x+iy$) where

$$z = (\sqrt{3}-i)^6.$$

   Indicate the principal argument.

3. Using de Moivre's formula show that

$$\cos 5\theta = 16\cos^5\theta - 20\cos^3\theta + 5\cos\theta$$

   [Recall the *binomial formula*

$$(a+b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \cdots + b^n$$

   where $\binom{n}{r} = \frac{n!}{r!(n-r)!}$.]

4. Find all the roots in each case:

   (a) $\sqrt{2i}$

   (b) $(-8-8\sqrt{3}i)^{1/4}$

   Express your answers in rectangular coordinates, i.e., in the form $x+iy$.