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Homework set 1: Due Friday September 19 at 12 noon.

Homework should be given to me (or my possible replacement) in class  
or put under my office door. Do not put it in my lobby mail box. No credit  
will be given for homework turned in late.

1. Show that \((-\frac{1+i\sqrt{3}}{2})^3 = 1\) and that \((-\frac{1-i\sqrt{3}}{2})^3 = 1\).

2. Determine the principal argument Arg(z) for  
\(z = \frac{-2}{1+i\sqrt{3}}\) and \((\sqrt{3} - i)^6\).

3. Show that there are complex numbers \(z\) which satisfy  
\(|z-a| + |z+a| = 2|c|\) if and only if the complex numbers \(a\) and \(c\) satisfy  
\(|a| \leq |c|\).

4. Given two complex numbers \(a\) and \(b\), find of all possible pairs of com-
plex numbers \(c\) and \(d\) so that the four numbers are the vertices of a
square.

5. Let \(a, b,\) and \(c\) be the vertices of a triangle in the complex plane. Show  
that the area of the triangle equals \((1/2)|b - c|^2|Im \frac{c-a}{c-b}|\).

6. Show, by considering its real and imaginary parts, that the equation  
\(\sin z = 0\) only has roots on the real axis.