Complex Analysis

Math 312 — MWF 10:30-11:25am
Spring 1996 — 201 Fowler

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Worksheet #5 **(Monday 02/05/96)**

SUMMARY square roots of complex numbers; algebraic/transcendental numbers

The **primitive m-th root of unity**, ω_m is defined as

$$\omega_m = \exp\left(\frac{2\pi i}{m}\right) =$$

The **principal root** of a complex number is
If you look at the complete set of roots of unity you can see that they can be written as

$$1, \omega_m, \omega_m^2, \omega^3, \ldots, \omega_m^{m-1}$$

We will show this for the four 4-th root of 1, $1^{1/4}$ below

$$\begin{aligned} c_0 &= & 1 \\ c_1 &= & \omega_m &= \\ c_2 &= & \omega_m^2 &= \\ c_3 &= & \omega_m^3 &= \end{aligned}$$

We can also take the m-th roots of other numbers besides 1, say z_0. In that case one needs to solve

$$z^m = z_0$$

Write down the formula for $\{d_k\}_{k=0}^{m-1}$, the m m-th roots of z_0
$d_k =$

Use your formula to find the cube roots of $-8i$.

Here's another more challenging example: Find $\sqrt{5 - 12i}$.