On Thursday I mentioned running into a problem with even roots.

First note that for odd roots there is no problem:

$$(-8)^{1/3} = -2$$

An odd root of a positive number is positive and an odd root of a negative number is negative.

Things are different for even roots as this will demonstrate the problem:

$$\left((-4)^2\right)^{1/2} = \sqrt{(-4)^2} = (16)^{1/2} = 4$$

$$\left((-4)^{1/2}\right)^2 = \left(\sqrt{-4}\right)^2 = (2i)^2 = -4$$

But if we used the laws of exponents

$$\left((-4)^2\right)^{1/2} = (-4)^1 = -4 \qquad \text{Which is incorrect.}$$

So, there's a potential problem when we find even roots of negative numbers, that doesn't occur with odd roots.

Here's a chart to clarify the situation

	Even Roots	Odd Roots
Positive Numbers	Positive	Positive
Negative Numbers	Imaginary	Negative

The problem gets more complicated if you take an irrational root of a negative number. In that case you get a Complex number.