The solutions of $x^6 = x^3$ using *Phantom Graphs*

Most people just put $x^6 - x^3 = 0$

$x^3(x^3 - 1) = 0$

$x = 0$ or 1

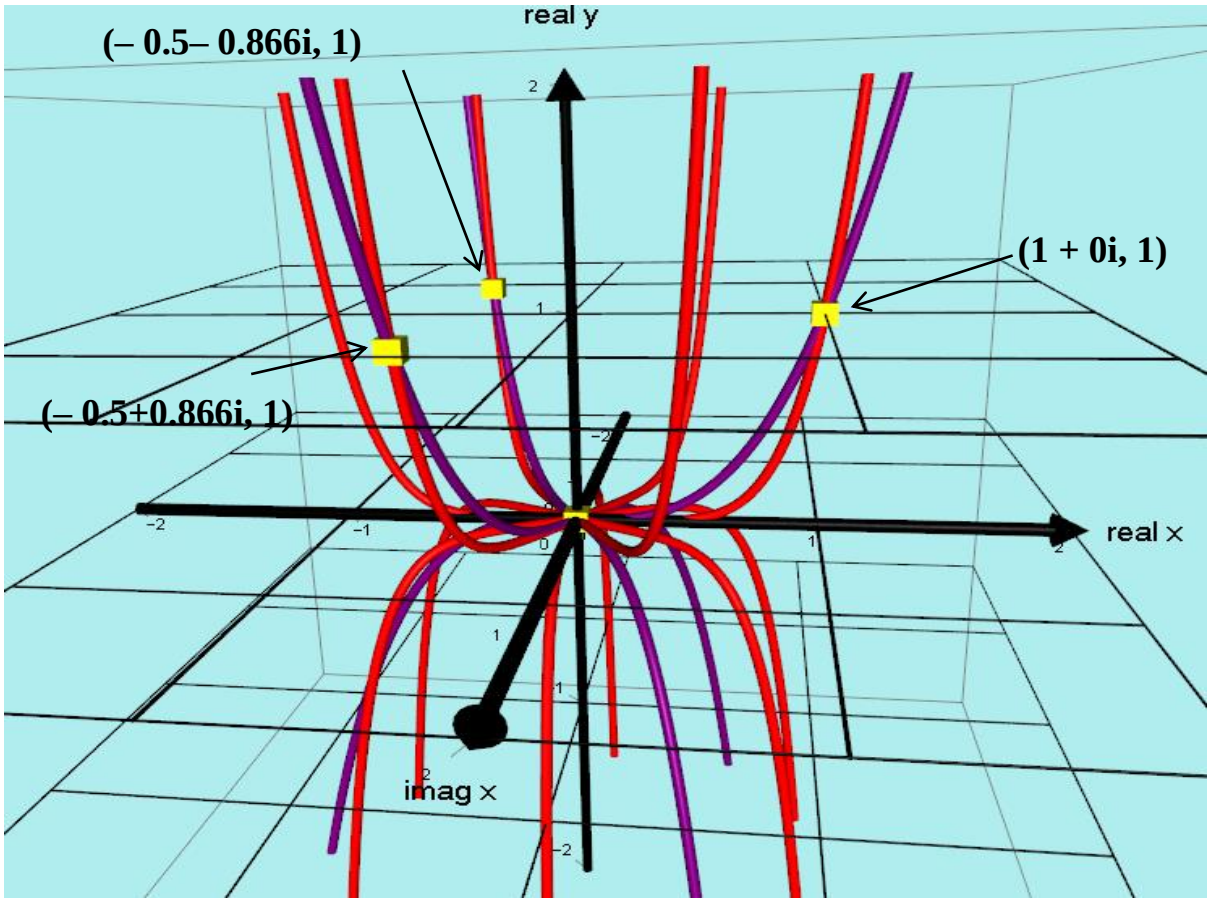
Some of the better people carried on and put if $x^3 = 1$ let $x = r\,cis(\theta)$
So that $r^3cis(3\theta) = 1cis(360n)$ by using De Moivre's Theorem
This means $r = 1$ and $3\theta = 360n$ so $\theta = 120n = 0°, 120°, 240°$
(actually most people use radians but I work better in degrees)

The solutions are: $x_1 = 1\,cis(0) = 1$

$$x_2 = 1\,cis(120) = \frac{-1}{2} + \frac{i\sqrt{3}}{2}$$

$$x_3 = 1\,cis(240) = \frac{-1}{2} - \frac{i\sqrt{3}}{2}$$

So my special contribution was to draw the graphs $y = x^6$ and $y = x^3$ with their *phantoms* which shows all the solutions clearly.



Incidentally, because of the Fundamental Theorem of Algebra there are 3 more solutions at the origin. The graphs actually cross 3 more times there.