The Amazing Graph of y = (–1)^x

I looked at the equation $\mathbf{y = (-1)^x}$ and found some fascinating results!

$(-1)^0 = 1$, $(-1)^{½} = \boldsymbol{i}$, $(-1)^1 = -1$, $(-1)^{1½} = \boldsymbol{-i}$

$(-1)^2 = 1$, $(-1)^{2½} = \boldsymbol{i}$, $(-1)^3 = -1$, $(-1)^{3½} = \boldsymbol{-i}$

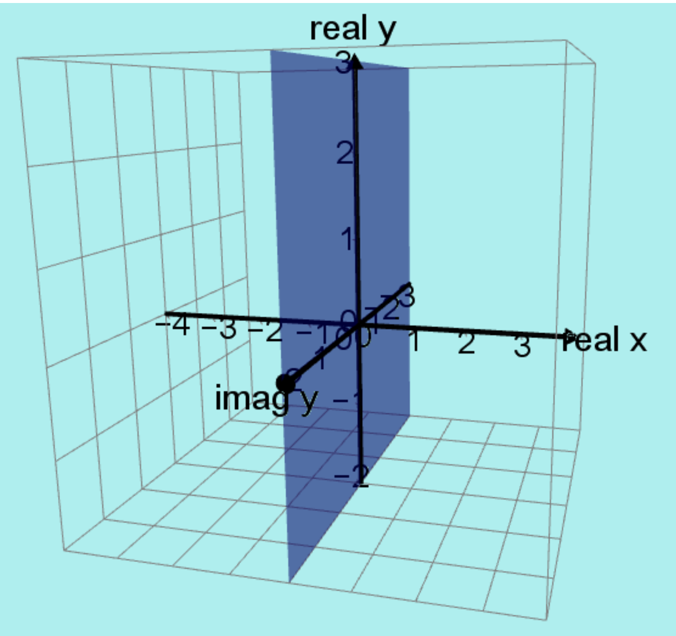
$(-1)^4 = 1$, $(-1)^{4½} = \boldsymbol{i}$, $(-1)^5 = -1$, $(-1)^{5½} = \boldsymbol{-i}$

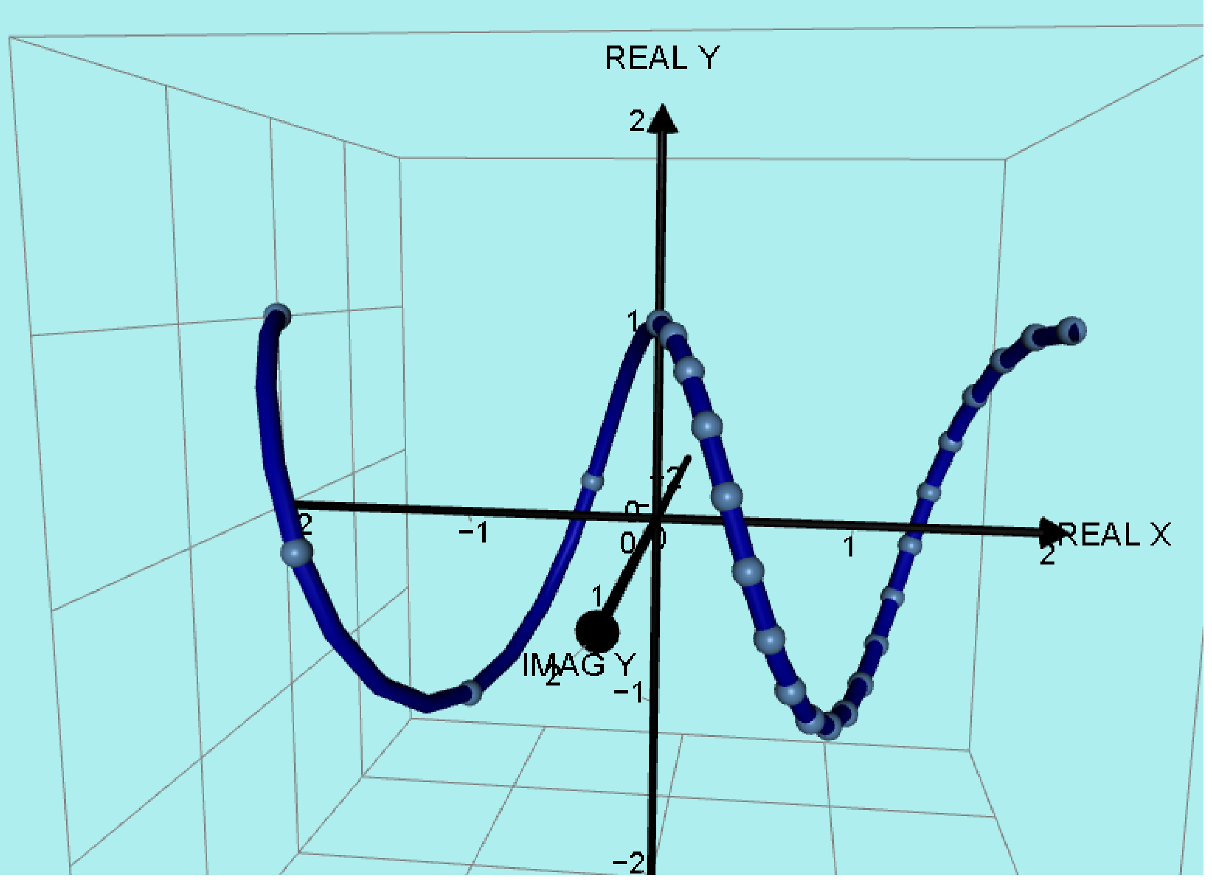
But the value of $\mathbf{y = (-1)^x}$ does not just jump from **1** to ***i*** to **– 1** to ***–i***
It takes all the values in between!

$(-1)^0 = 1$ and $(-1)^{½} = \boldsymbol{i}$ ***but*** $(-1)^{\frac{1}{3}} = \mathbf{\frac{1}{2}} + \boldsymbol{i}\mathbf{\frac{\sqrt{3}}{2}}$ **and** $(-1)^{\frac{1}{4}} = \mathbf{\frac{\sqrt{2}}{2}} + \boldsymbol{i}\mathbf{\frac{\sqrt{2}}{2}}$

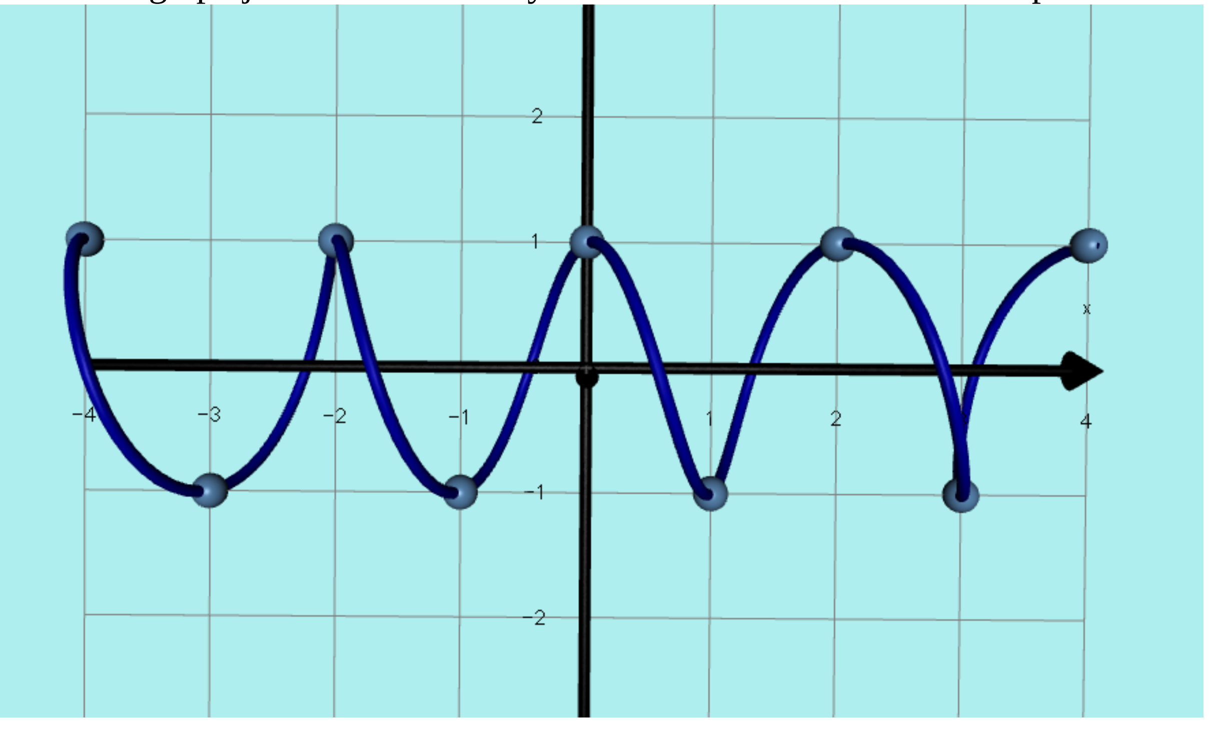
and $(-1)^{\frac{3}{4}} = -\mathbf{\frac{\sqrt{2}}{2}} + \boldsymbol{i}\mathbf{\frac{\sqrt{2}}{2}}$

The graph of $\mathbf{y = (-1)^x}$ in order to accommodate **real** and **imaginary y** values needs to have an **<u>ordinary x axis</u>** for real numbers only but a **<u>complex y plane</u>**.

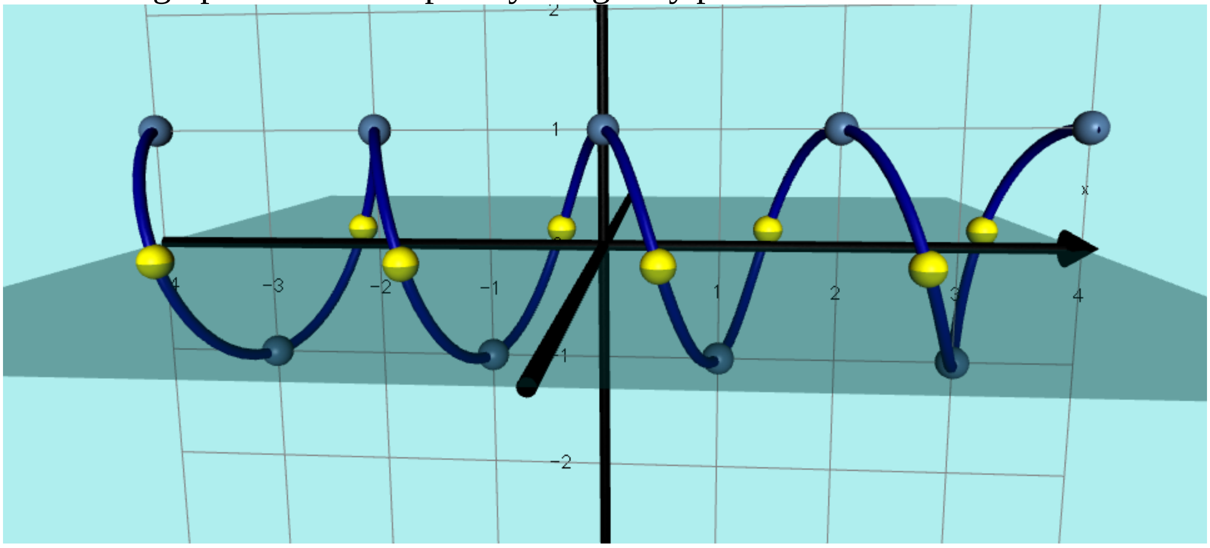




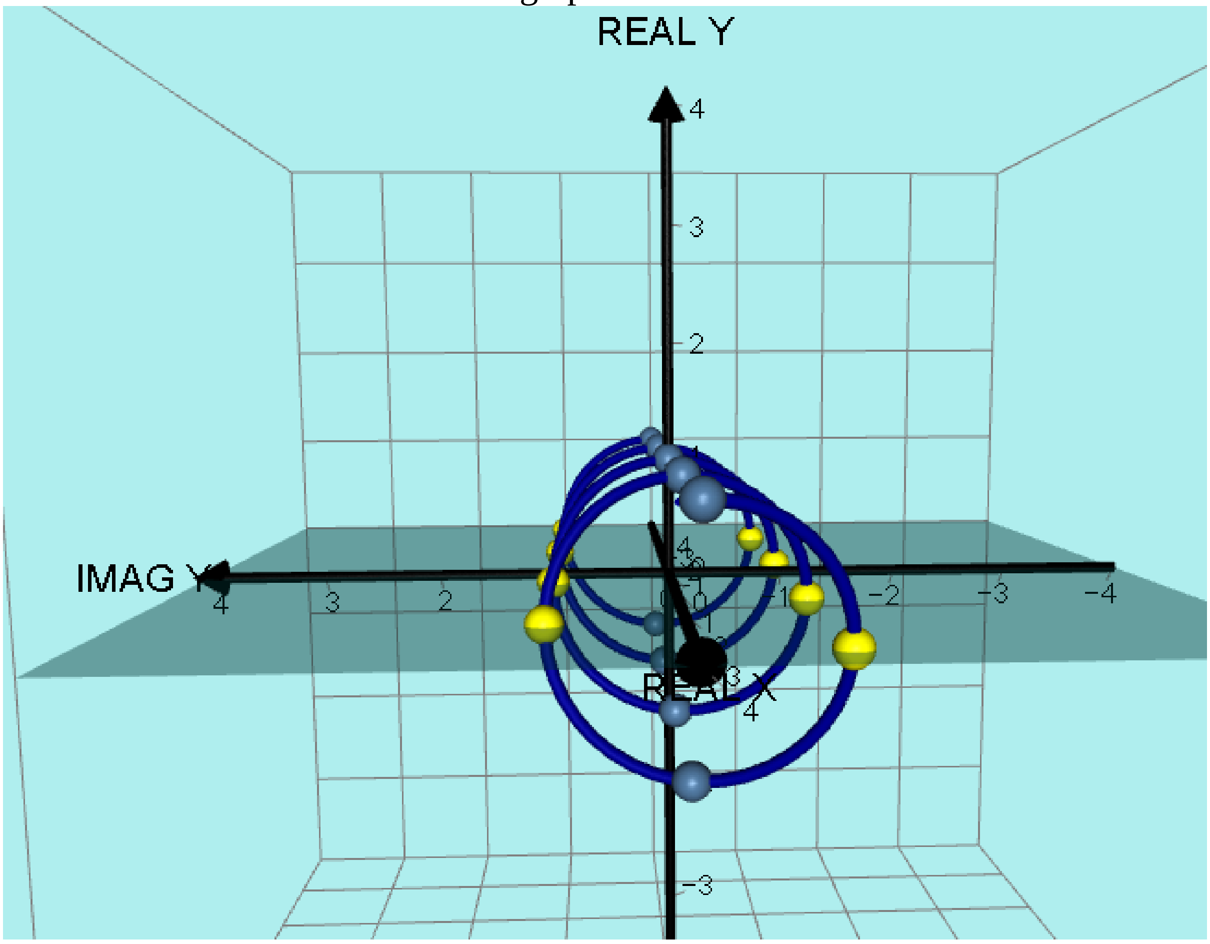
This next graph just has the REAL y values marked as PALE BLUE points.



This next graph has the completely imaginary points marked in YELLOW



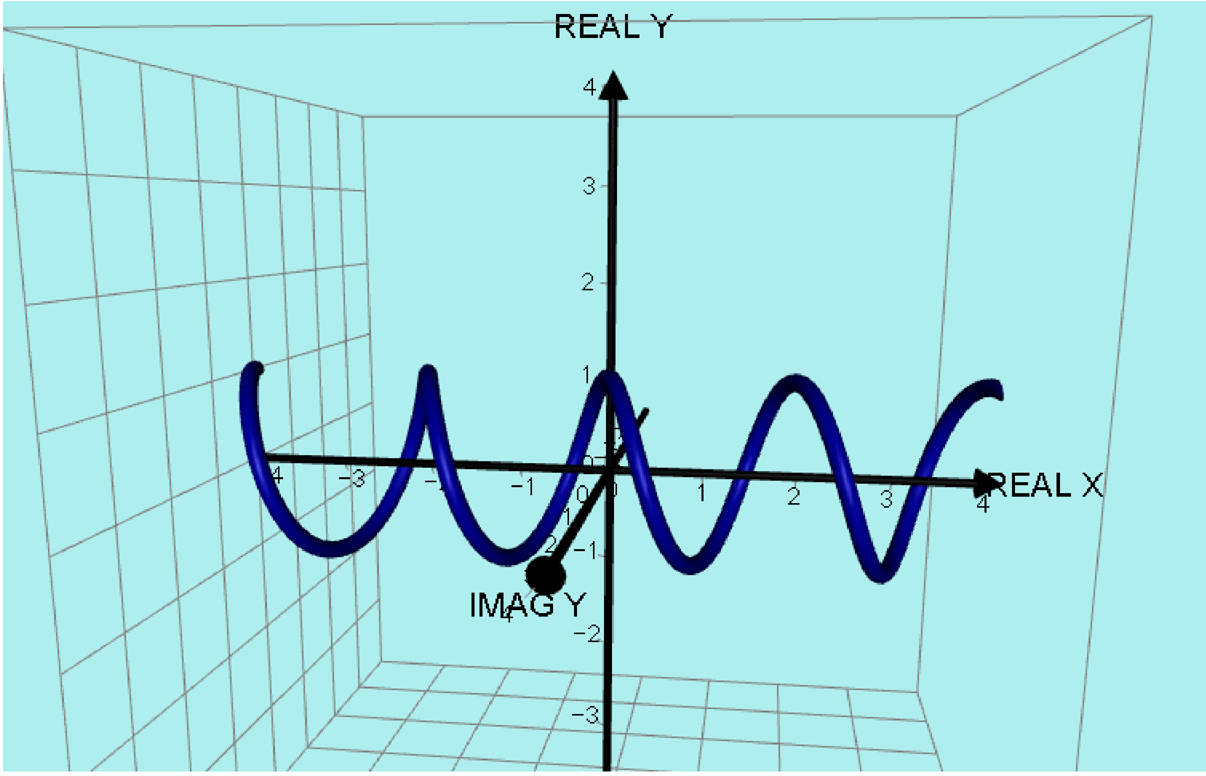
This is an END view of the above graph:



As you can see the values do not just jump between **1** to ***i*** to **– 1** to **–*i.***
It is continuous!

The result is this beautiful HELIX.

Here is just the plain graph:



You can see more on this type of concept on my website……………….

www.phantomgraphs.weebly.com