Complex Number Basics

Import some stuff

In [3]:
```
import matplotlib.pyplot as plt
import numpy as np
from numpy import pi, exp, sin, cos, arccos, log, e
```

Question 2

$\cos(z) = 100 \Rightarrow z = 2n\pi + i\cosh^{-1}(100) = 2n\pi + i\ln(100 \pm \sqrt{9999})$

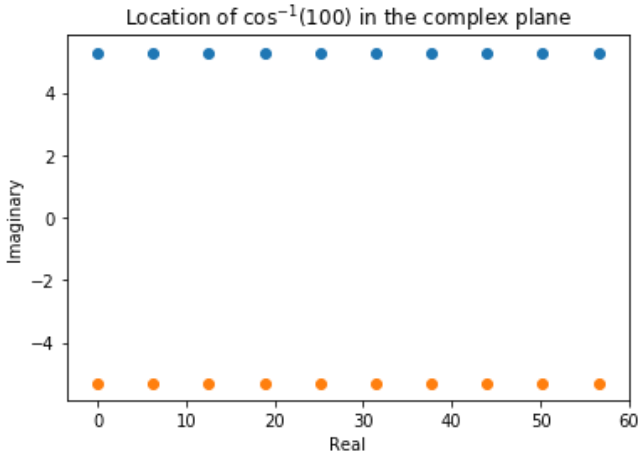
In [54]:
```
ZRe = []
ZIm = []

for n in range(0, 10):
    zRe = 2*pi*n
    zIm = np.arccosh(100)
    ZRe.append(zRe)
    ZIm.append(zIm)

ZImn = [i*(-1) for i in ZIm]
```

In [55]:
```
# Plot it out:
plt.figure(1)
plt.scatter(ZRe, ZIm, marker='o')
plt.scatter(ZRe, ZImn, marker='o')
plt.xlabel(r'Real')
plt.ylabel(r'Imaginary')
plt.title(r'Location of $\cos^{-1}(100)$ in the complex plane')
```

Out[55]:
```
Text(0.5,1,'Location of $\\cos^{-1}(100)$ in the complex plane')
```



Question 3

$z = ln(-5) \Rightarrow z = ln(5) + i(\pi \pm 2n\pi)$

In [26]:
```
# The function:
Z3Re = []
Z3Im = []

for n in range(0, 10):
    z3 = log(5) + i*pi + i*2*n*pi
    Z3Re.append(z3.real)
    Z3Im.append(z3.imag)
```

In [35]:
```
# Plot it out:
plt.figure(2)
plt.scatter(Z3Re, Z3Im, marker='o')
plt.xlabel(r'Real')
plt.ylabel(r'Imaginary')
plt.title(r'Location of $ln(-5)$ in the complex plane')
```

Out[35]: Text(0.5,1,'Location of $ln(-5)$ in the complex plane')