The wavefunction

$$\Psi(x,t) = Ae^{i(kx-\omega t)} = A\{\cos(kx-\omega t) + i\sin(kx-\omega t)\}$$

Euler's equation

$$e^{i\phi} = \cos\phi + i\sin\phi$$

$$e^{-i\phi} = \cos\phi - i\sin\phi$$

Trigonometric functions :

$$\cos\phi = \frac{e^{i\phi} + e^{-i\phi}}{2}$$

$$\sin\phi = \frac{e^{i\phi} - e^{-i\phi}}{2i}$$

Graphical representation of a complex number z as a point in the complex plane. The horizontal and vertical Cartesian components give the real and imaginary parts of z respectively.

$$ii = -1$$

$$\frac{d}{dx}e^u = e^u\frac{du}{dx}$$

$$\text{conjugate}(a+ib) = (a-ib)$$
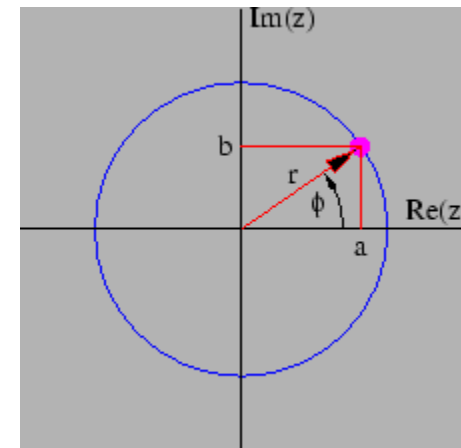
if $z = a + ib$, then :

$$z^*z = (a+ib)(a-ib)$$

$$= a^2 - i^2b^2$$

$$= a^2 + b^2$$