Summary
Interference of coherent waves

Resultant intensity of two equal-intensity waves of the same wavelength at the same point in space:

$$I = 4\, I_1 \cos^2(\phi/2)$$

In order to calculate I, we need to know ϕ.

For unequal intensities, the maximum and minimum intensities are

$$I_{max} = |A_1 + A_2|^2$$
$$I_{min} = |A_1 - A_2|^2$$

The phase difference between the two waves may be due to a difference in their source phases or in the path difference to the observer, or both. The difference due to path difference is:

$$\phi = 2\pi(\delta/\lambda)$$

where $\delta = r_2 - r_1$

Note: The phase difference can also be due to an index of refraction, because that will change the wavelength.