1. In a Young's double-slit experiment, the angle that locates the second dark fringe on either side of the central bright fringe is 5.4°. Find the ratio d/λ of the slit separation d to the wavelength λ of the light.

Dark Fringes in a double-slit experiment have the defining equation

$$d\sin(\theta) = \left(m + \frac{1}{2}\right)\lambda$$

Solve for the ratio

$$\frac{d}{\lambda} = \frac{\left(m + \frac{1}{2}\right)}{\sin(\theta)} = \frac{\left(1 + \frac{1}{2}\right)}{\sin(5.4°)} = 15.9$$

Note, first dark fringe is m=0, so second is m=1

$$\frac{d}{\lambda} = 16$$

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