

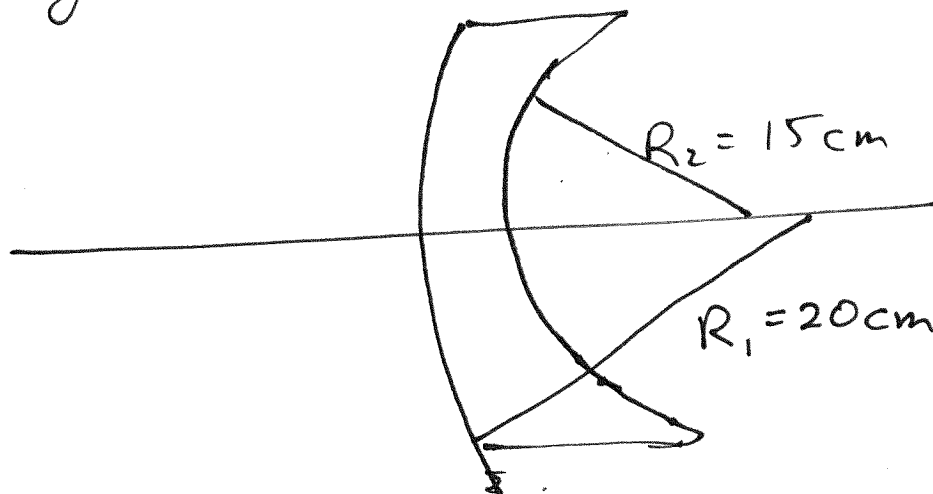
Ch.2 Prob. 136

Find the focal length of a meniscus lens with

$$R_1 = 20 \text{ cm} \quad + \quad R_2 = 15 \text{ cm}$$

$$n = 1.5$$

Drawing out the lens gives



Using the lens maker formula

$$\frac{1}{f} = \left(\frac{n_2}{n_1} - 1 \right) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$$

$$\frac{1}{f} = \left(\frac{1.5}{1} - 1 \right) \left(\frac{1}{20 \text{ cm}} - \frac{1}{15 \text{ cm}} \right) = (0.5) \left(\frac{3}{60} - \frac{4}{60} \right)$$

$$= (0.5) \left(-\frac{1}{60} \right) = -\frac{1}{120}$$

$$f = -120 \text{ cm}$$

This is a diverging lens with

focal length $f = 1.2 \text{ m}$