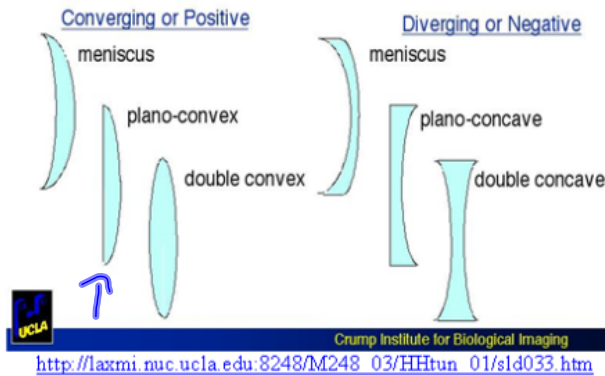


Types of Lenses



Examples

1. What is the focal length of a Plexiglas plano-convex lens that has a radius of 15.7 cm?

$$f = ?$$

$$n_{\text{lens}} = 1.51$$

$$n_0 = 1.0003$$

$$R_1 = \infty \text{ cm}$$

$$R_2 = +15.7 \text{ cm}$$

$$\frac{1}{f} = \left(\frac{n_{\text{lens}}}{n_0} - 1 \right) \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$$

$$\frac{1}{f} = \left(\frac{1.51}{1.0003} - 1 \right) \left(\frac{1}{\infty} + \frac{1}{15.7} \right)$$

$$\frac{1}{f} = (0.5095) (0 + 0.06369)$$

$$\frac{1}{f} = (0.5095)(0.06369)$$

$$\frac{1}{f} = 0.03245$$

$$f = (0.03245)^{-1}$$

$$f = 30.8 \text{ cm} \quad \leftarrow + \text{ so converging.}$$