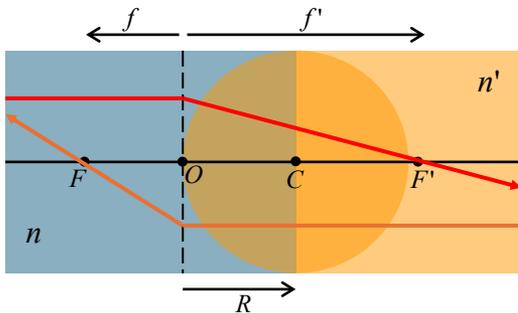
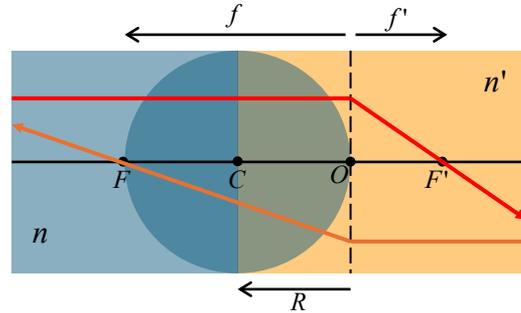


Single Refractive Surface



Note: 1) $R > 0$



Note: 1) $R < 0$

Variable Definitions

$F \equiv$ Focal Point Object $f \equiv$ Object Focal Length $C \equiv$ Center of Curvature
 $F' \equiv$ Focal Point Image $f' \equiv$ Image Focal Length $R \equiv$ Radius of Curvature

$$\text{Power: } \psi = \frac{n' - n}{R} = -\frac{n}{f} = \frac{n'}{f'}$$

Focal Points and Lengths

$$\text{Definition: } f = \overline{OF} \quad f' = \overline{OF'}$$

$$\text{Location: } f = -\frac{Rn}{n' - n} = -\frac{n}{\psi} \quad f' = -\frac{Rn'}{n' - n} = \frac{n'}{\psi}$$

Location of Cardinal Points

$$O \rightarrow P, P', N, N'$$

$$\overline{OP} = 2f \quad \overline{OP'} = 2f' \quad \overline{ON'} = -\overline{ON} = f' \left(1 + \frac{n}{n'} \right) = -f \left(1 + \frac{n'}{n} \right) = \frac{n + n'}{\psi} = R \left(\frac{n' + n}{n' - n} \right)$$