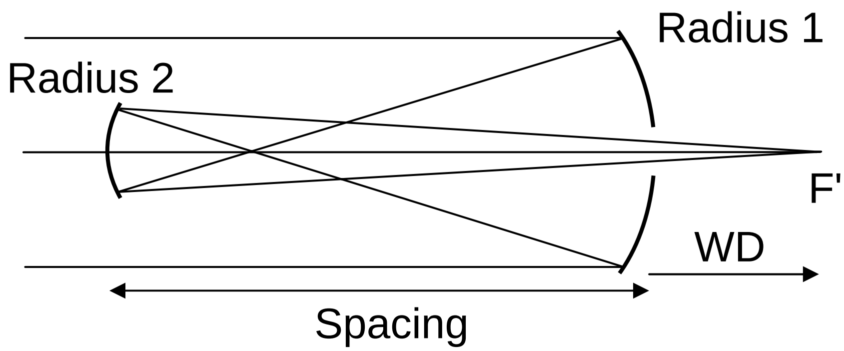
Gregorian Objective



a)

$R_1 = -100$ mm

$R_2 = 40$ mm

$t = -75$ mm

$\phi = (n' - n)/R$

$n_1 = n_3 = 1.0$

$n_2 = -1.0$

$\phi_1 = -2/R_1 = .02$ /mm

$\phi_2 = 2/R_2 = .05$ /mm

$\phi = \phi_1 + \phi_2 - \phi_1 \phi_2 \tau$

$\tau = t/n_2 = 75$ mm

$\phi = -.005$ /mm

$f = -200$ mm

$$\delta' = d' = -\frac{\phi_1}{\phi}\tau \qquad \text{(from } R_2\text{)}$$

$$d' = 300 \text{ mm} \qquad \text{(to the right of } R_2\text{)}$$

$$BFD = d' + f'_{R2} = d' + f = 100 \text{ mm} \qquad \text{(from } R_2\text{)}$$

$$WD = BFD - \text{Spacing} = BFD + t$$

$$\underline{WD = 25 \text{ mm}}$$

b) The rear principal plane is to the right of the rear focal point.

The primary mirror forms an intermediate image that is relayed or re-imaged by the secondary mirror to the system rear focal point. The intermediate image is real.

As a result, an object ray for an object at infinity produces an image ray that approached F′ from the opposite side of the optical axis (from below). We must go beyond the rear focal point F′ to find the plane of unit positive magnification P′. This plane is where the image ray has the same height as the object ray.