1 Snell's law

1.1 Disregarding ray velocity:

$$\eta_1 \sin\theta_1 = \eta_2 \sin\theta_2$$

1.2 Considering ray velocity:

$$\frac{\sin\theta_1}{\sin\theta_2} = \frac{v_1}{v_2} = \frac{\eta_1}{\eta_2}$$

2 Application of ray diagrams:

- Beyond $2F$

  Image: $\mathbb{R}$, F'$< I < 2F$', inverted, smaller

- On $2F$

  Image: $\mathbb{R}$, $I = 2F$', inverted, same size

- Between $2F$

  Image: $\mathbb{R}$, $I > F$', inverted, larger

- On F

  Image at ∞

- Between F and lens

  Image: virtual, $I < 2F$, erect, larger

3 Gauss lens equations:

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

real-is-positive convention

4 Linear magnification ratio:

$$m = \frac{v}{u} = \frac{h_i}{h_o}$$

5 Arranged form of linear magn. ratio:

$$m = \frac{1}{f} \cdot v - 1$$