

Lenses

Physics

The lens equation, magnification, and the sign convention.

The reciprocal of the focal length equals the sum of the reciprocals of object and image distances.

$$1/f = 1/u + 1/v \cdot m = v/u$$

Converging lens, object beyond $2f$ **Real, inverted, diminished**

Object inside f

A magnifying glass.

Virtual, upright, magnified

Diverging lens

f is negative.

Always virtual, upright, diminished

THE COMMON MISTAKE

✗ Ignoring signs

✓ Applying the convention consistently

Virtual images give a negative v , and diverging lenses a negative f . Dropping the signs gives impossible answers.

Power in dioptries is $1/f$ with f in metres. A +2 D lens has a focal length of 0.5 m.