

Lenses and Mirrors Equations Worksheet

Level: GCSE / A-Level / AP Physics 2 | Difficulty: Intermediate | Topic: Waves & Optics

Practice with 10 problems on the thin lens equation, mirror equation, magnification, and image formation. Full worked solutions included.

Equations you will need

$1/f = 1/u + 1/v$	Thin lens / mirror equation
$M = -v/u$	Magnification (linear)
$M = h_i / h_o$	Magnification from image and object height
$P = 1/f$	Lens power

Symbol key

Symbol	Quantity	Unit
f	focal length	m
u	object distance	m
v	image distance	m
M	magnification	dimensionless
h_o	object height	m
h_i	image height	m
P	power	D (dioptries)

Practice problems

- Object 30 cm from a converging lens with $f = 10$ cm. Find image distance.
- Same setup: find magnification.
- A 5 cm tall object 20 cm from a lens, $f = 15$ cm. Find image height.
- Find focal length of a lens with power +2.5 D.
- Object 12 cm from a concave mirror with $f = 20$ cm. Find v .
- A converging lens ($f = 8$ cm) forms an image at 24 cm. Find the object distance.

7. A diverging lens with $f = -10$ cm: object at 15 cm. Find image position.
8. Object at f (focal point) of a converging lens. Where is image?
9. Magnifying glass: object 4 cm from $f = 8$ cm lens. Find magnification.
10. A camera lens with $f = 50$ mm photographs an object 2 m away. Find image distance.