

13. Geometric Optics

Starter Quiz · 课前小测

AP Physics 2

Name: _____ Score: _____

1. A ray strikes a mirror at 30° to the normal. At what angle to the normal does it reflect, in degrees?
_____°
2. You stand 0.5 m in front of a flat mirror. How far behind the mirror is your image, in metres?
_____ m
3. Light goes from air ($n_1 = 1$) into glass ($n_2 = 1.5$) at $\theta_1 = 30^\circ$ ($\sin 30^\circ = 0.5$). What is $\sin \theta_2$? (Give a decimal.)

4. An object is 6 cm from a converging lens of $f = 2$ cm. What is the image distance v , in cm?
_____ cm
5. The law of reflection states that:
☐ the angle of incidence is twice the angle of reflection
☐ the angle of incidence equals the angle of reflection
☐ the angles are measured from the surface
☐ light does not reflect
6. A plane mirror image is:
☐ real and inverted
☐ virtual, upright and the same size
☐ always magnified
☐ always tiny
7. Entering a denser medium (like glass), a light ray bends:
☐ away from the normal
☐ toward the normal
☐ straight back
☐ not at all
8. A converging (convex) lens is:
☐ thinner in the middle
☐ thicker in the middle

- ☐ perfectly flat
- ☐ always tiny

9. In optics, angles are always measured from the _____ (the perpendicular line).

10. Which type of image can be projected onto a screen?

- ☐ a virtual image
- ☐ a real image
- ☐ both equally
- ☐ neither

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Answers · 答案

AP Physics 2

1. **30 °**

$\theta_r = \theta_i = 30^\circ$ by the law of reflection.

2. **0.5 m**

A plane mirror puts the image as far behind as the object is in front: 0.5 m.

3. **0.33**

$\sin \theta_2 = n_1 \sin \theta_1 / n_2 = 0.5 / 1.5 = 0.33$.

4. **3 cm**

$1/v = 1/2 - 1/6 = 2/6 \Rightarrow v = 3$ cm.

5. **the angle of incidence equals the angle of reflection**

$\theta_i = \theta_r$, both measured from the normal.

6. **virtual, upright and the same size**

It is virtual, upright and the same size as the object.

7. **toward the normal**

Slower in a denser medium, the ray bends toward the normal.

8. **thicker in the middle**

A converging lens is thicker in the middle and bends parallel rays to a focus.

9. **normal**

The normal is perpendicular to the surface; all optics angles use it.

10. **a real image**

A real image forms where rays actually cross, so it can be caught on a screen.