

PHYSICS 2204
UNIT 4: WAVES
WORKSHEET 13: REFLECTION AND MIRRORS

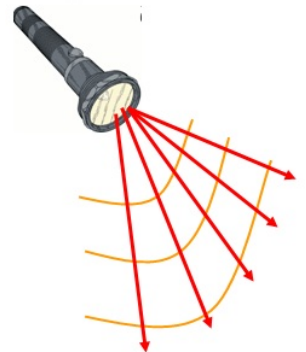


The Ray Model of Light:

Some properties of light are best described by considering light as a wave. The ray model of light uses a straight line with an arrowhead, or ray, to show the direction the light wave is traveling

Ray of light is an extremely narrow beam of light

Rectilinear Propagation refers to the property of light to travel in a straight line. Shadows demonstrate that light travels in straight lines.



Reflection of Light:

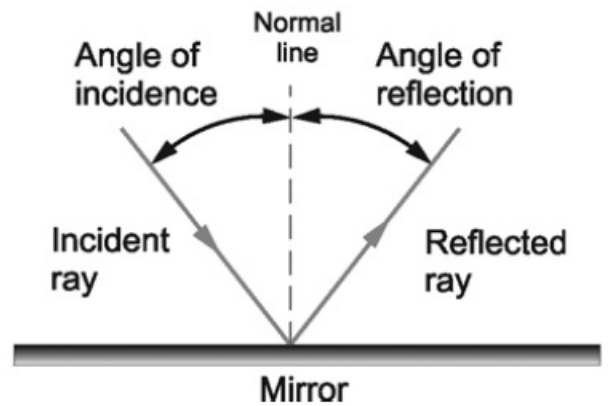
Incident ray: the incoming light ray

Reflected ray: the ray that bounces off the barrier

Normal: An imaginary line that is perpendicular to the barrier.

Angle of incidence: The angle formed by the incident ray and the normal.

Angle of reflection: The angle formed by the reflected ray and the normal.



Law of Reflection: states that when an object hits a surface, its angle of incidence will equal the angle of reflection.

Image Properties:

1. S – size (Larger or Smaller than object)
2. P – position (Closer or Further away from mirror or optical centre)
3. O – orientation (upright or inverted)
4. T – type (Real or Virtual)

Plane Mirror: refers to flat mirrors

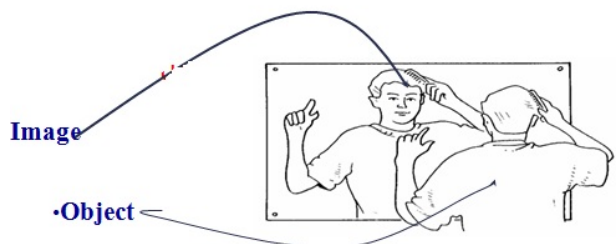
Characteristics of images using plane mirrors:

Image size is equal to object size

Image distance is equal to object distance

The image is upright

The image is virtual



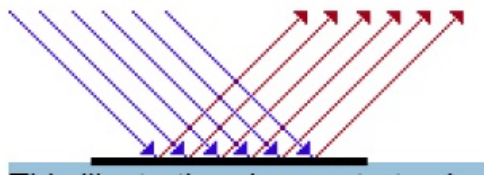
PART A: MULTIPLE CHOICE

General Instructions

Select the best correct response and shade the appropriate letter on the Scantron card

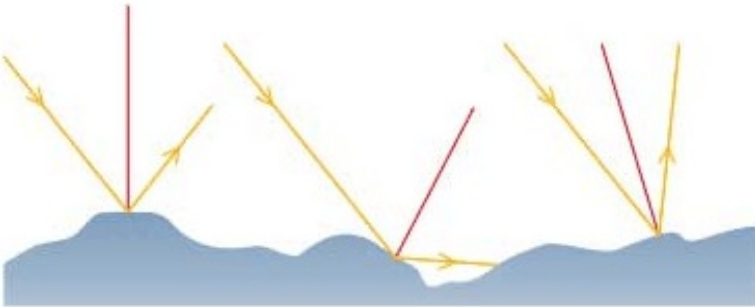
1. In the ray model of light, light is represented by
 - (A) A series of curves.
 - (B) Circles.
 - (C) Continuous waves.
 - (D) Straight lines.
2. The illustration below demonstrates how light travels. What name is given to this diagram?

- (A) Light sketch
- (B) Light diagram
- (C) Ray sketch
- (D) Ray diagram



Use the following information and diagram to answer questions 3 and 4

A rough surface will scatter incoming light rays in different directions, as shown by the yellow light rays in this diagram

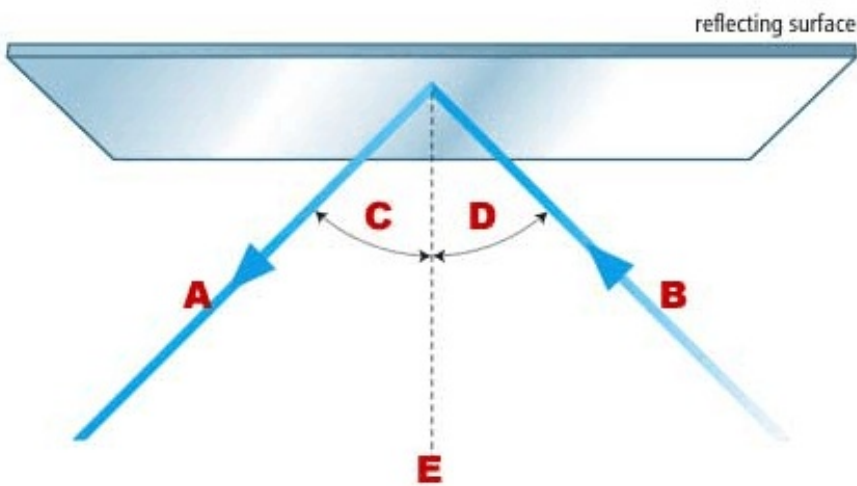


3. Why does the light scatter?
 - (A) The rough surface refracts light rays.
 - (B) The light rays are absorbed when they strike a rough surface.
 - (C) The light rays strike the rough surface at different angles.
 - (D) The light rays do not obey the law of reflection on a rough surface.
4. The lines in the diagram without arrows are known as
 - (A) Incident rays.
 - (B) Angles of incidence.
 - (C) Normal lines.
 - (D) Reflected rays
5. Which property light allows you to see yourself in a mirror?
 - (A) Absorption
 - (B) Dispersion
 - (C) Reflection
 - (D) Refraction

6. In plane mirrors, the image is always
- (A) Real and the same size as an object
 - (B) Real and different size as the object
 - (C) Virtual and the different size as the object
 - (D) Virtual and the same size as the object
7. Reflection is the process in which light strikes a surface and bounces off that surface. The reflected ray will bounce back directly to the light source if it is lined up with the ...
- (A) Incident ray
 - (B) Normal line
 - (C) Reflected ray
 - (D) Reflecting surface

Use the following information and diagram to answer questions 8, 9, and 10.

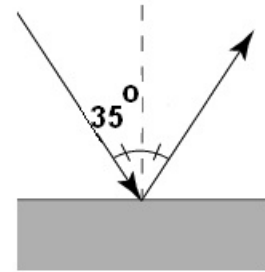
A light ray striking a shiny surface will reflect.



8. What does the letter "C" in the diagram indicate?
- (A) Angle of incidence
 - (B) Angle of refraction
 - (C) Reflected ray
 - (D) Angle of reflection
9. What does the letter "B" in the diagram indicate?
- (A) Normal
 - (B) Incident Ray
 - (C) Angle of incidence
 - (D) Reflected ray
10. What does the letter "E" in the diagram indicate?
- (A) Angle of reflection
 - (B) Incident ray
 - (C) Normal
 - (D) Reflected ray

11. Use the diagram below, what is the measure of the angle of reflection?

- (A) 0°
- (B) 35°
- (C) 55°
- (D) 65°



12. The diagram below shows the letter P in front of a plane mirror

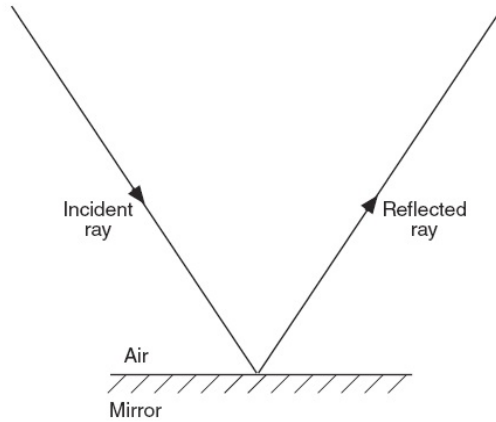


Which diagram best represents the image of P produced by the plane mirror?

- (A)
- (B)
- (C)
- (D)

PART B: WRITTEN RESPONSE

1. The diagram below shows an incident ray hitting a plane mirror.



- (A) Using a protractor and ruler, construct and label the normal to the mirror at the point of incidence on the diagram on your answer paper. [2]
- (B) Using a protractor, measure the angle of incidence to the nearest degree and record the value on your answer paper. [2]
2. Directions: Construct the image produced in the following diagrams and state the image properties

Property	Image

3. Light strikes a mirror's surface at 20 degrees to the normal. What will the angle of reflection be?
4. A ray of light strikes a mirror. The angle formed by the incident ray and the reflected ray measures 90 degrees. What are the measurements of the angle of incidence and the angle of reflection?