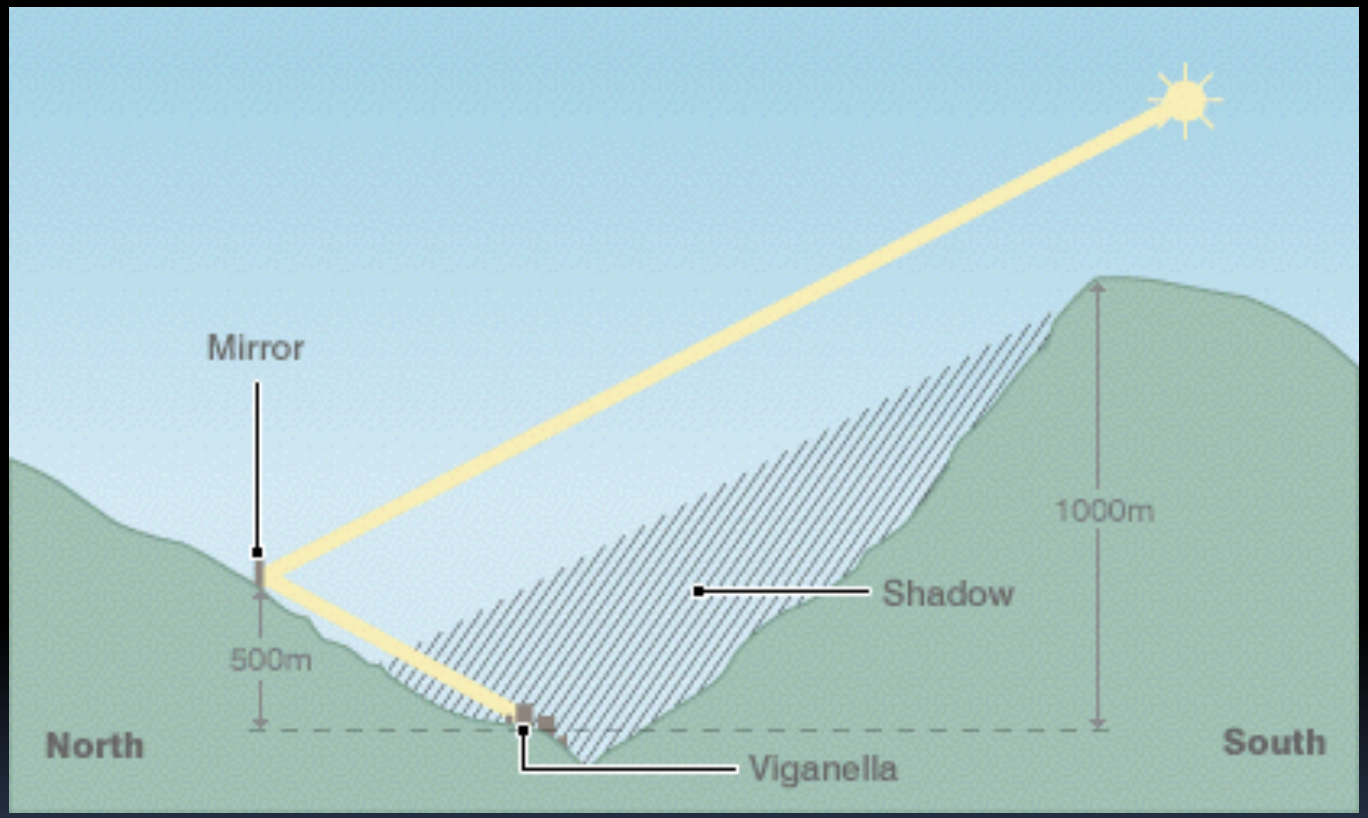
MIRRORS 1 – PLANE MIRRORS

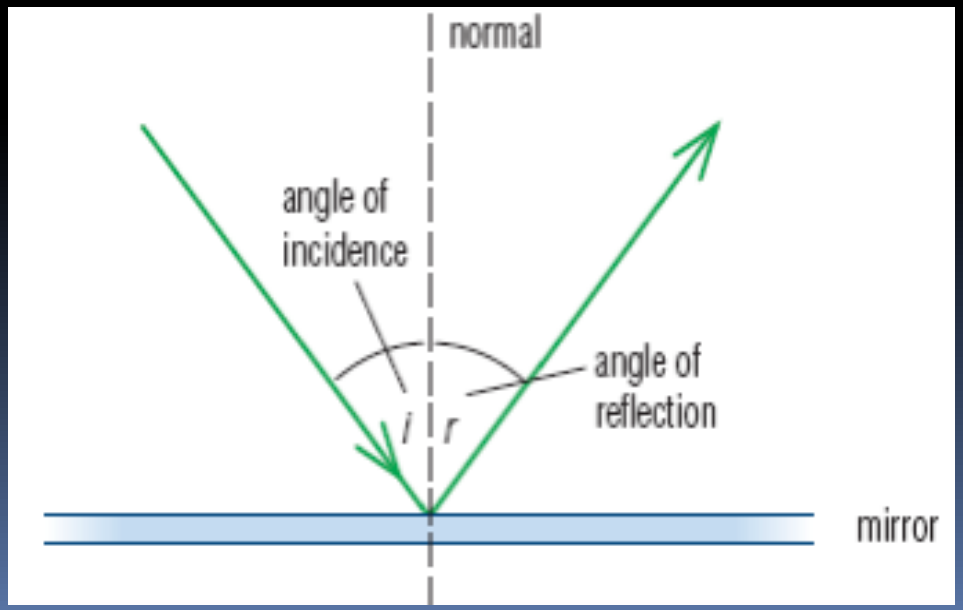

Mirror
1000m
Shadow
500m
North
South
Viganella

The Law of Reflection

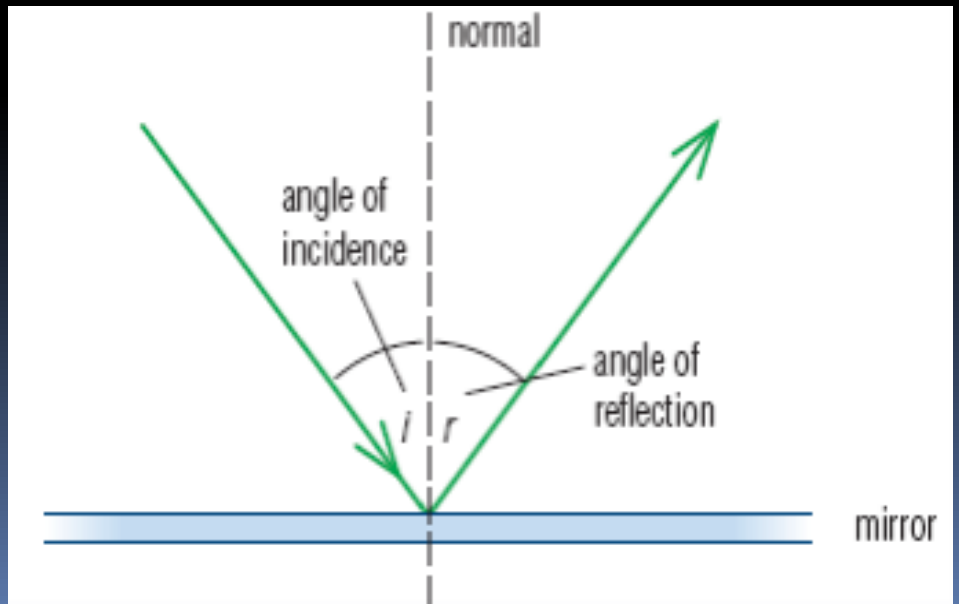
- Smooth, shiny surfaces allow you to see an image.
- The angle of incidence=the angle of reflection

RECALL from yesterday

- Normal – Dashed line drawn perpendicular to the mirror at point of reflection.
- Incident Ray – The Incoming Ray of light
- Reflected Ray – The outgoing Ray of light



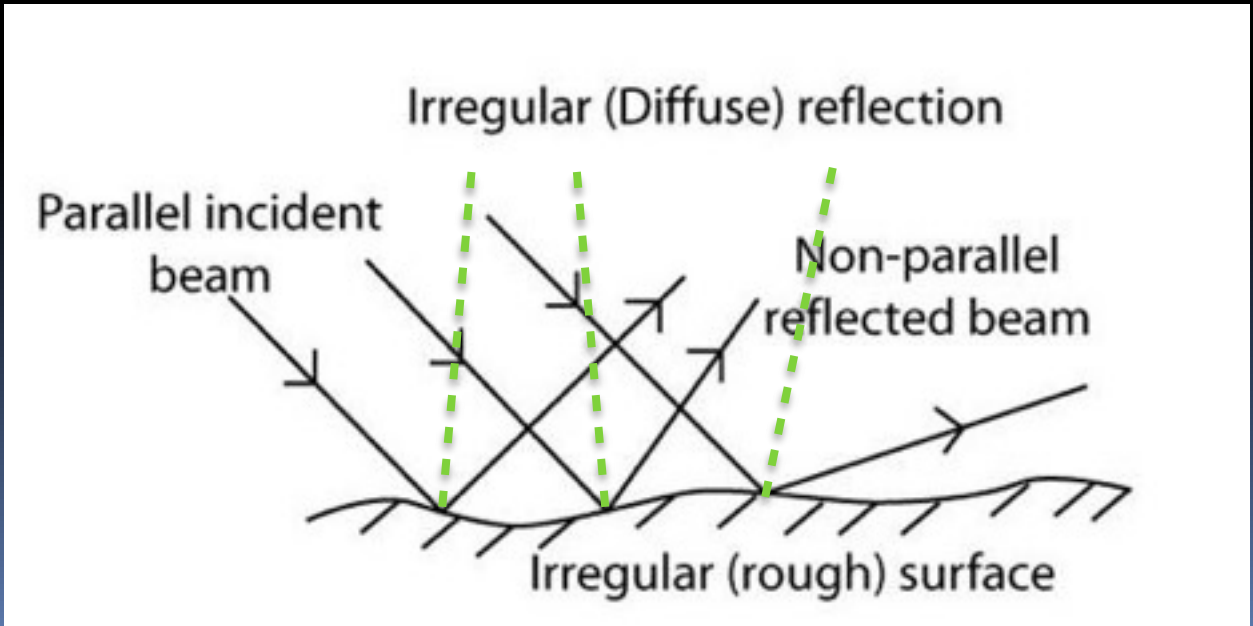
- Angle of Incidence – The angle between the incident ray and the normal. (θi)
- Angle of Reflection – The angle between the normal and the reflected ray. (θr)



Using the Law of Reflection

- The angle of incidence and the angle of reflection are always measured from the normal.

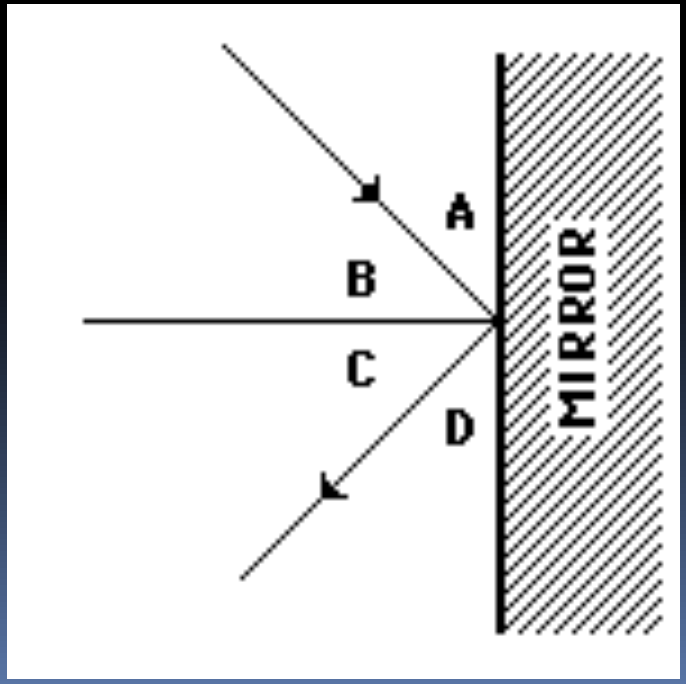
- normals are different on curved surfaces



Plane Mirrors

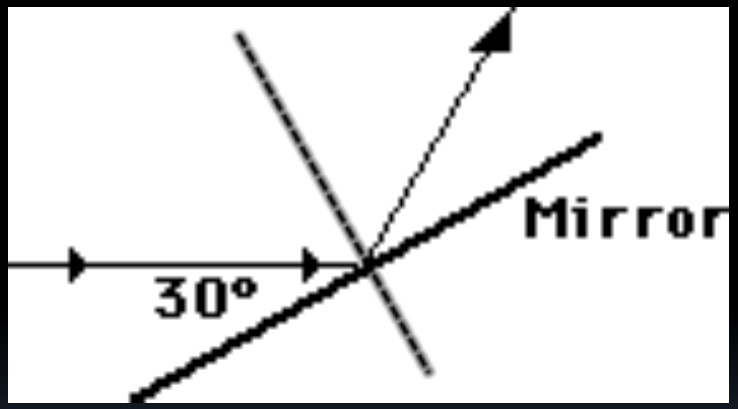
- Plane Mirror - Any mirror that has a flat reflective surface
- The image in a plane mirror appears to come from behind the mirror (**Virtual image**).
- It's location CAN be located

- 1. Consider the diagram at the right. Which one of the angles (A, B, C, or D) is the angle of incidence? ___B___ Which one of the angles is the angle of reflection? ___C___



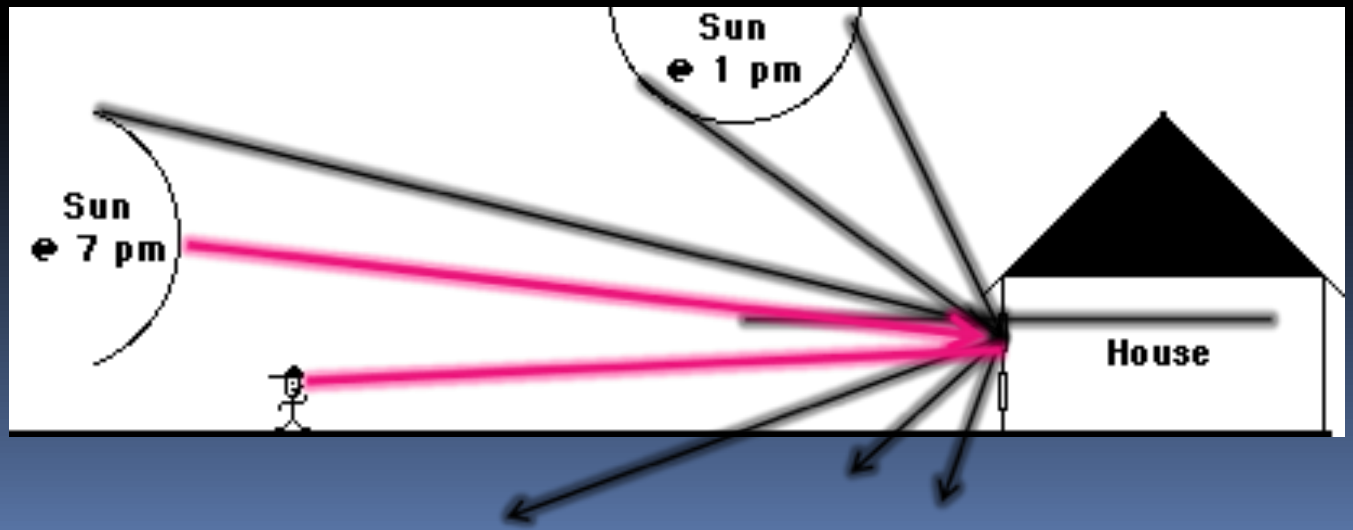
- 2. A ray of light is incident towards a plane mirror at an angle of 30 degrees with the mirror surface. What will be the angle of reflection?

90 – 30 = 60 degrees

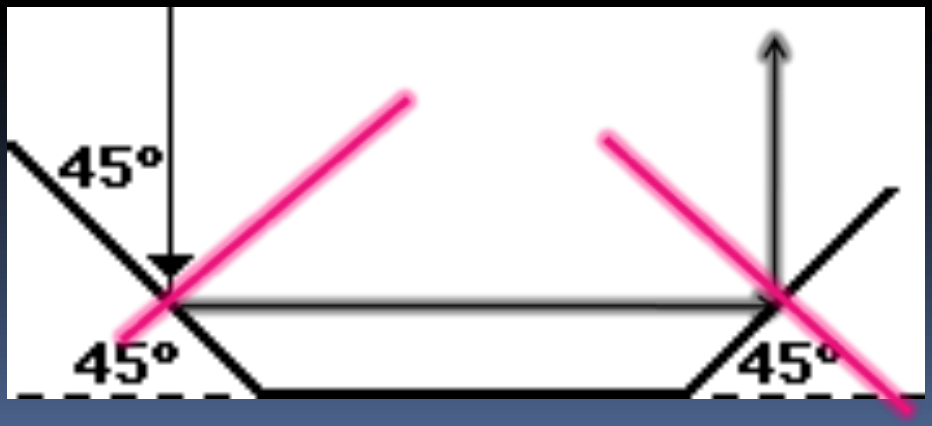


Law of reflection states that angle of incidence = angle of reflection
Therefore, the angle of reflection will be 60 degrees

- 3. Perhaps you have observed the image of the sun in the windows of distant buildings near the time that the sun is rising or setting. However, the image of the sun is not seen in the windows of distant building during midday. Use the diagram below to explain, drawing appropriate light rays on the diagram.



- 4. A ray of light is approaching a set of three mirrors as shown in the diagram. The light ray is approaching the first mirror at an angle of 45-degrees with the mirror surface. Trace the path of the light ray as it bounces off the mirror. Continue tracing the ray until it finally exits from the mirror system. How many times will the ray reflect before it finally exits?



Plane Mirrors

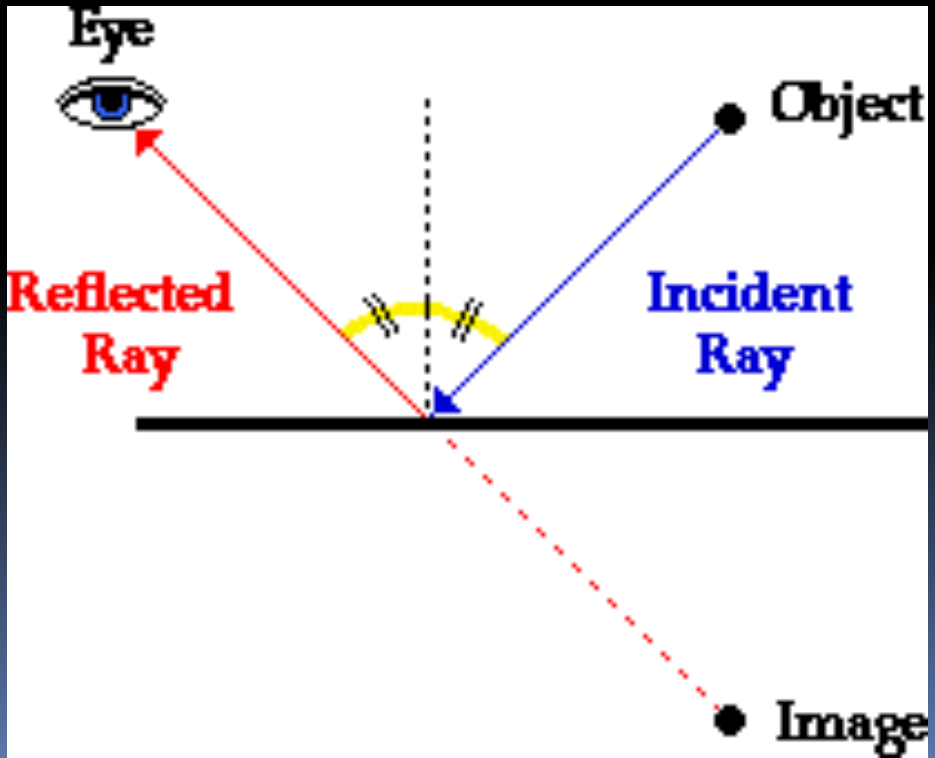
- Because the light rays are not coming from where your image appears to be, it is called a **virtual image.**
  - **Virtual image** - any image formed by rays that do not actually pass through the location of the image
  - **Real Images can be projected on to a screen and touched.**

Image Orientation in a Plane Mirror

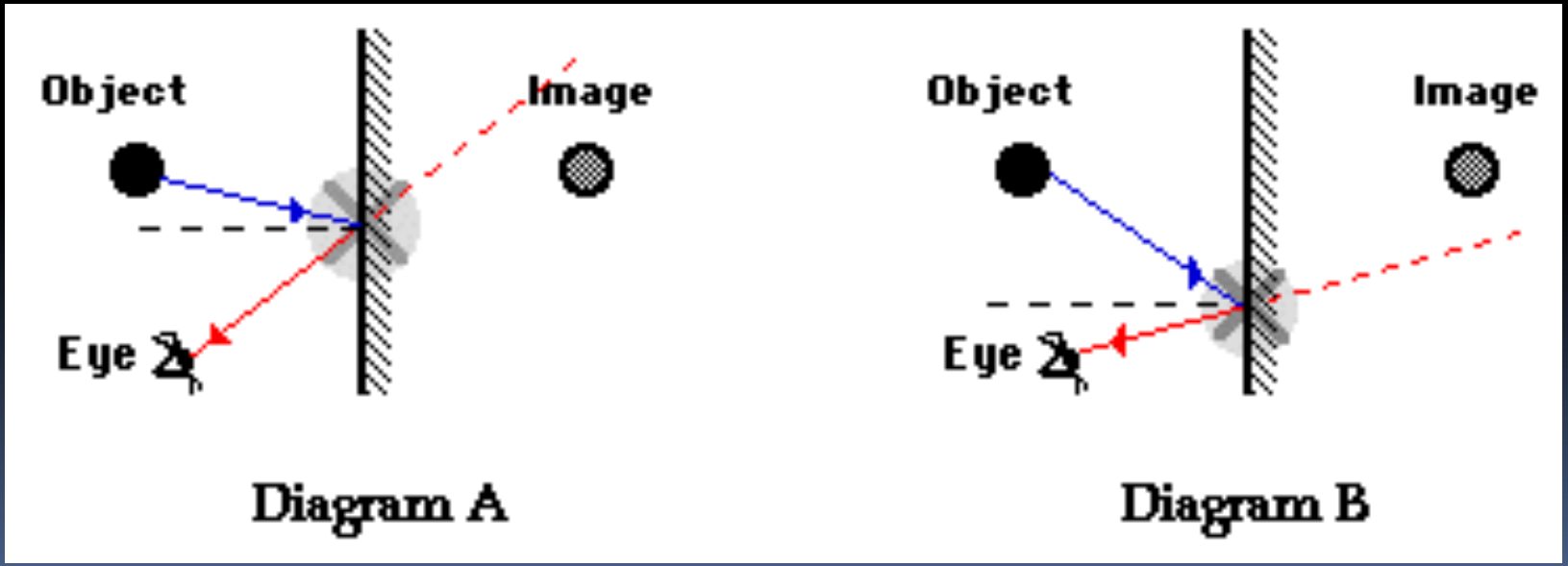
- The law of reflection also applies to looking at objects in a mirror.
- The image in a plane mirror is an exact reflection of the actual image.
- To view an image of a object in a mirror, you must sight along a line at the image location. As you see the image, light travels to your eye.

Image Orientation in a Plane Mirror

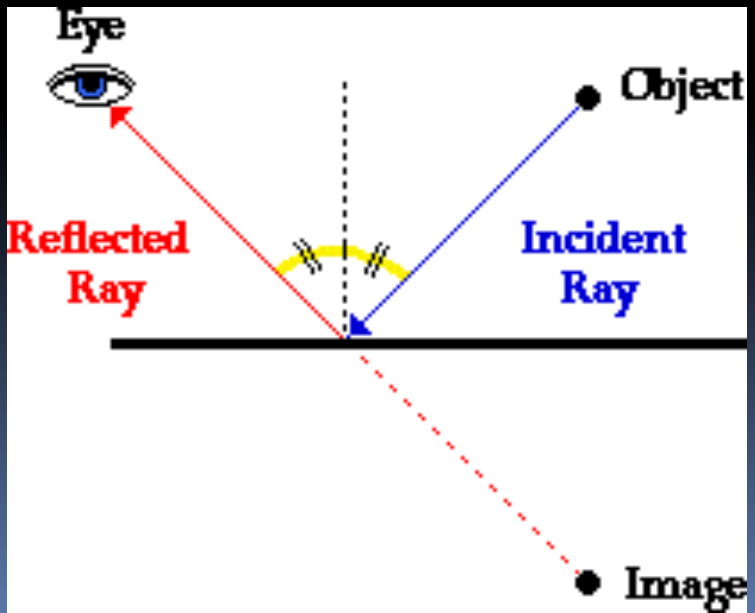
- The diagram shows that the light reflects off the mirror in such a manner that the angle of incidence is equal to the angle of reflection.



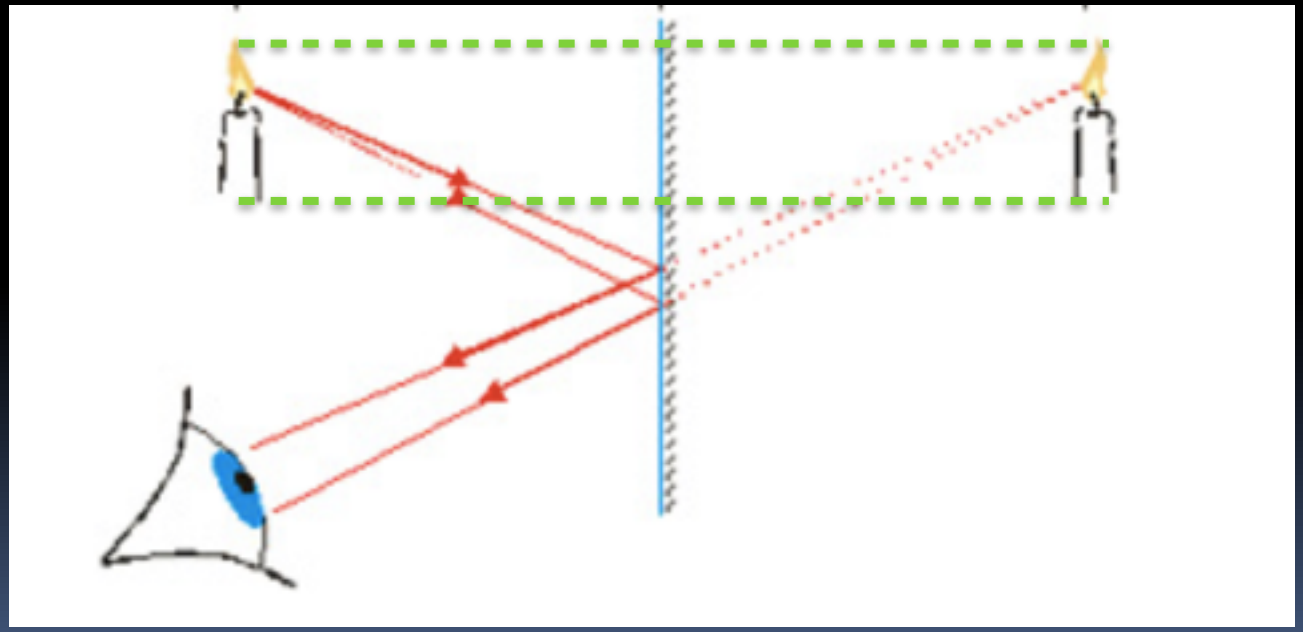
- In order to see the image, incident rays from the object must bounce off the mirror **at the same angle** as the reflected rays.
- In these cases the image would not be visible



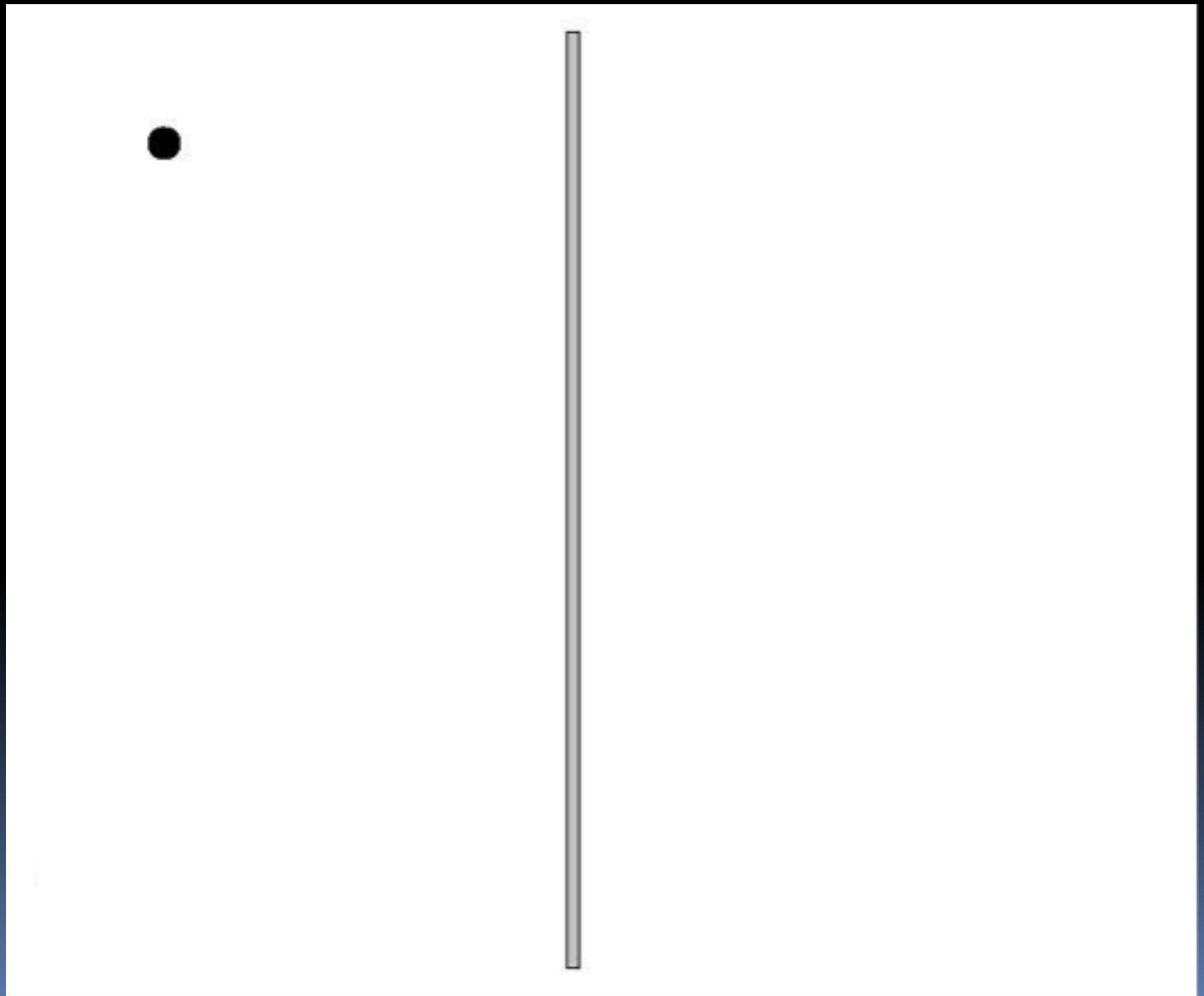
- When the image is sighted, it's reflected ray is visible.
- by extending that reflected ray back through the mirror, the image of the object can be located



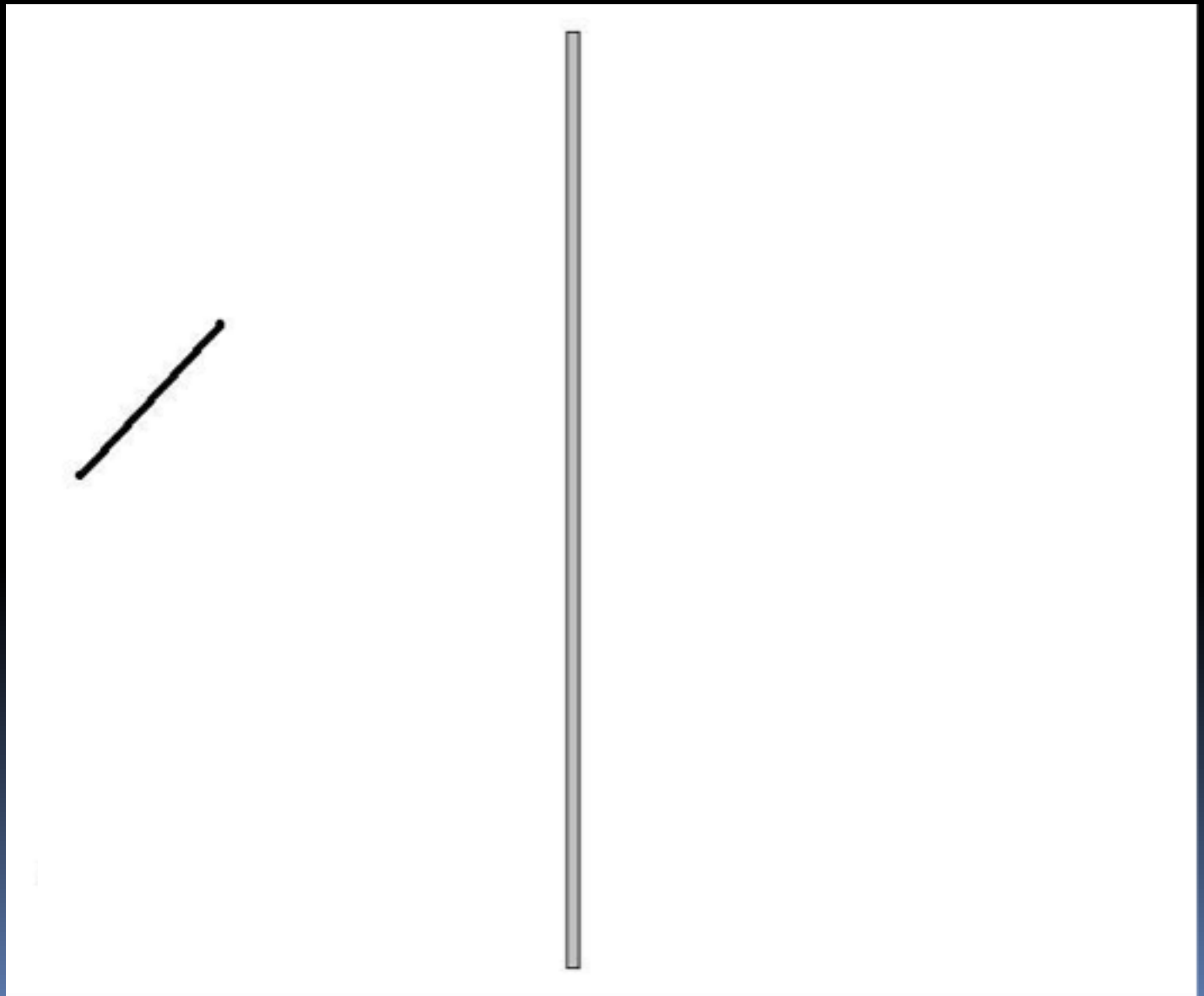
- to locate any point on the image, you need to draw only two light rays
- a ray from the top of the object parallel to the base line and a ray drawn from the top of the object to the point where the base line meets the mirror



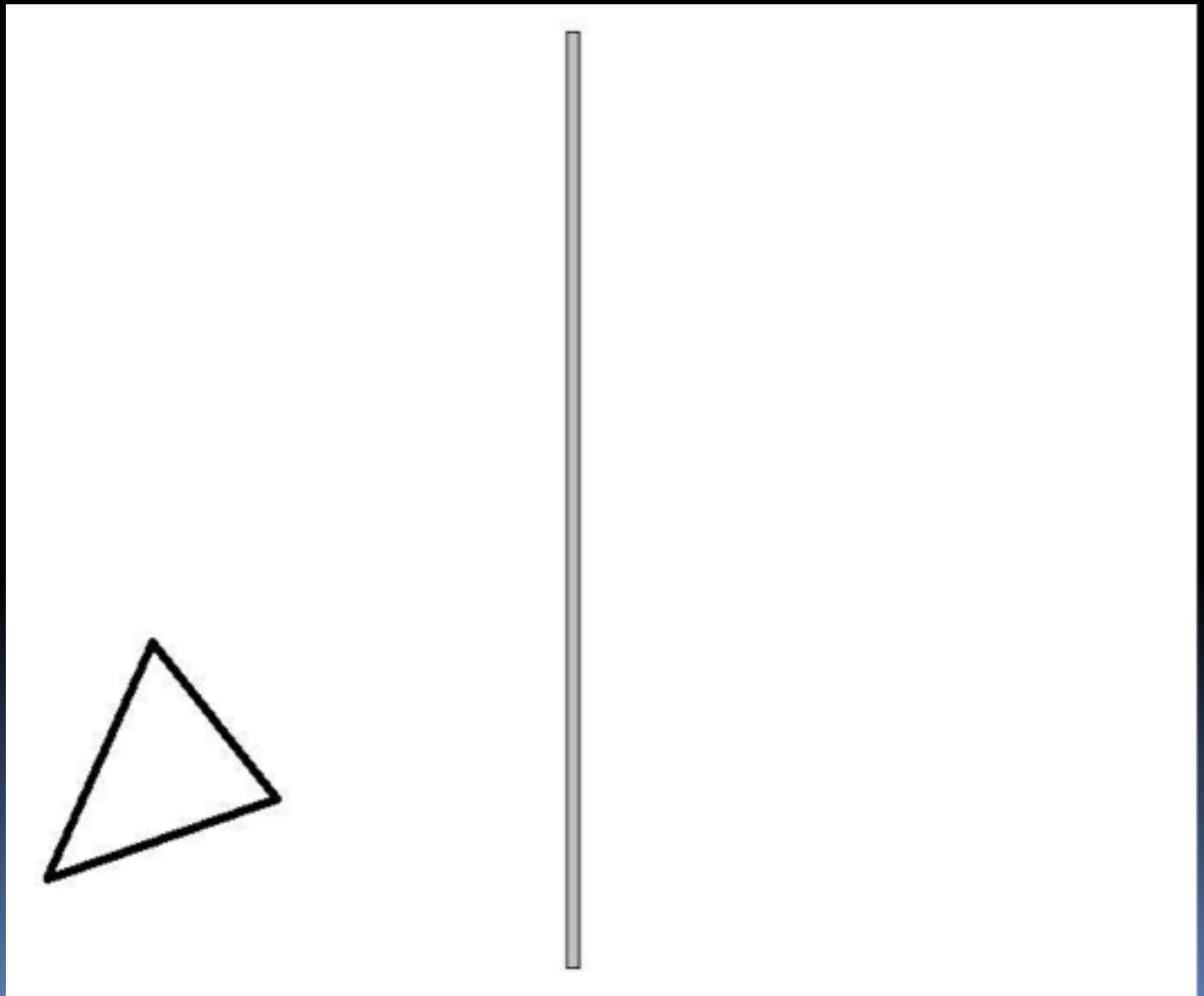
Plane mirror examples



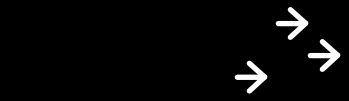
Plane mirror examples



Plane mirror examples



Homework



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