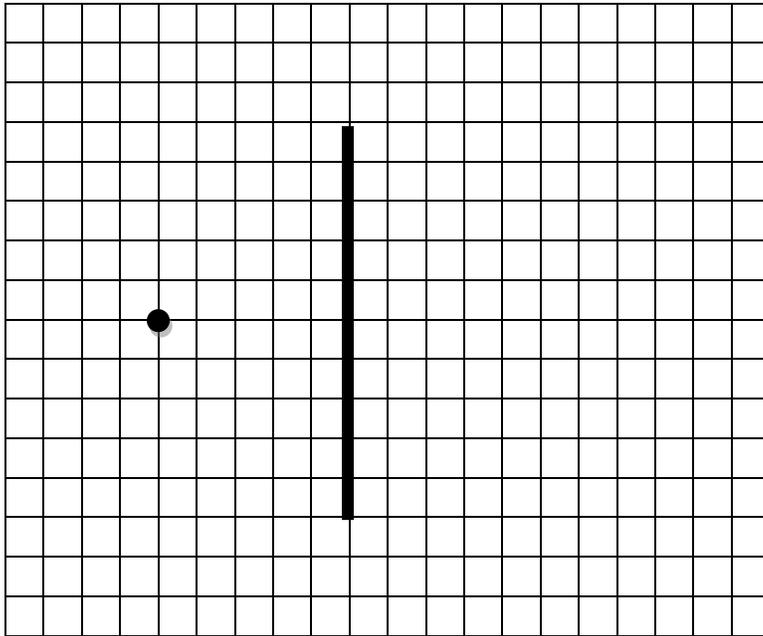


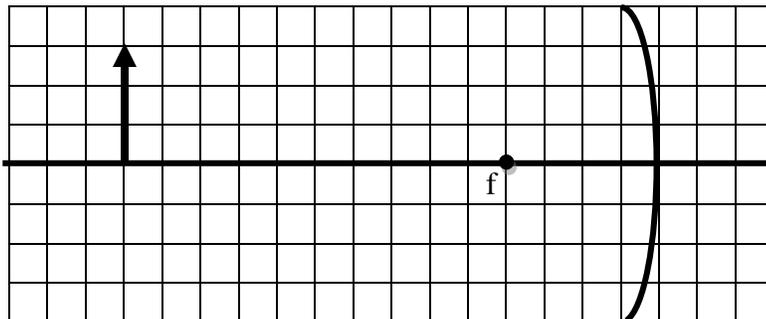
Optics Review

1. A mirror image which cannot be projected onto a screen is called a(n) _____ image
2. State the characteristics of an image in a flat or plane mirror.
3. How can you tell if an image in a mirror is real or virtual?
4. An object 6 cm high is placed 25 cm in front of a pinhole camera that is 15 cm long. Find the height of the image.
5. A square object has an area of 4 m^2 . It is placed 1 m from the point source of light. Calculate the area of the shadow produced on a screen 3 m from the light source.
6. If you stand 2 m in front of a plane mirror, how far from you is your image?
7. Shown is an object in front of a plane mirror. Show the ray diagram used to locate the image.



Complete the following ray diagrams:

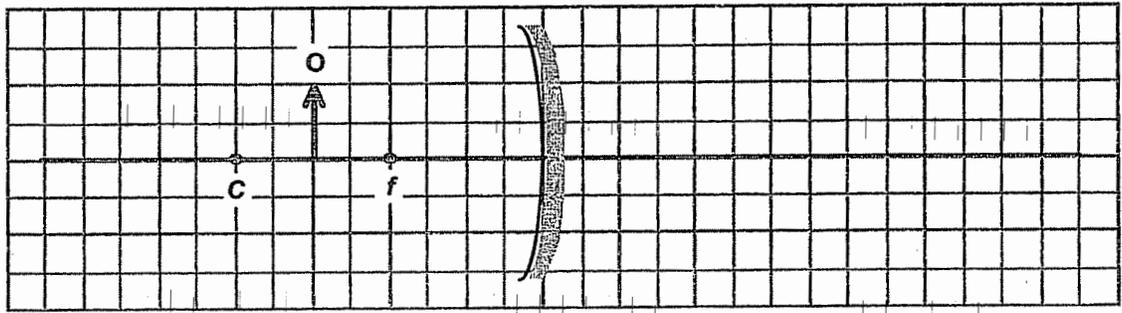
8. Concave mirror



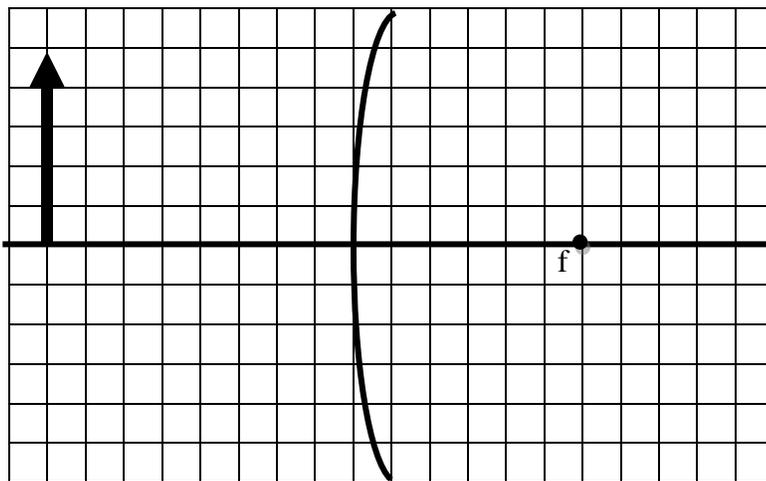
Estimate h_i based on your diagram.

Optics Review

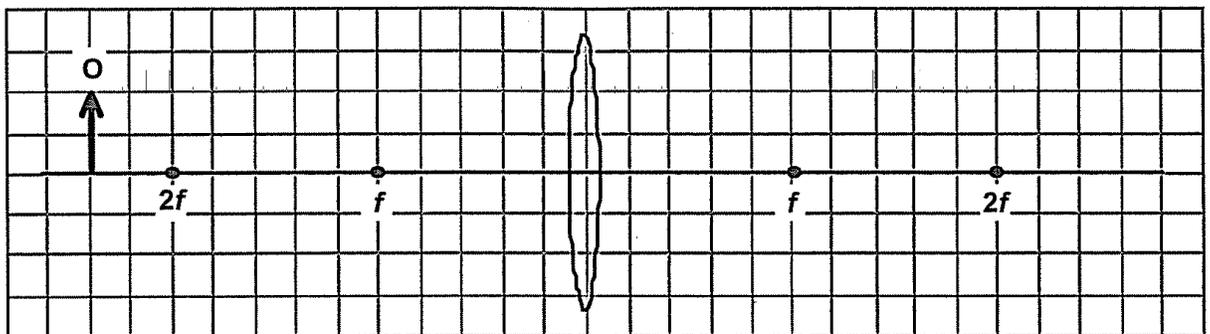
9. Concave mirror



10. Convex mirror

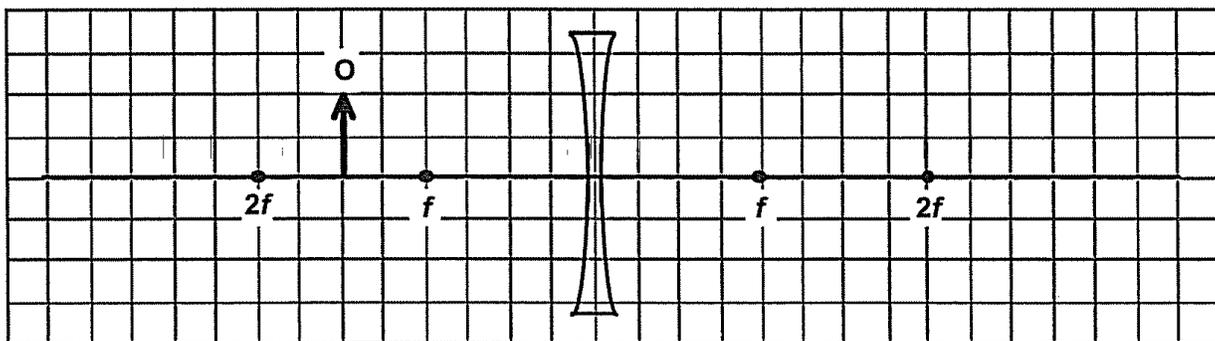


11. Convex lens:



Optics Review

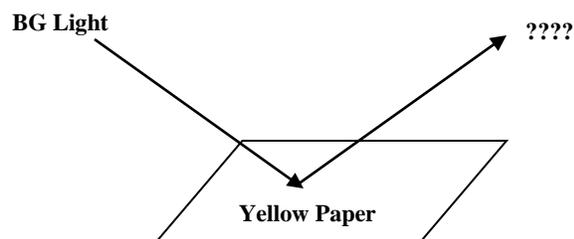
12. Concave lens



13. An object 5.0 cm tall produces an image that is 7.0 cm behind a concave mirror. If the radius of curvature is 8.0 cm, what is the magnification of the object?
14. Light from a distant star is collected by a concave mirror. How far from the mirror is the image of the star if the radius of curvature is 160 cm?
15. An object 3.5 cm tall is placed 8 cm in front of a convex mirror that has a focal length of -5.0 cm. Find the height of the image as well as its location.
16. In a department store, a mirror used to watch for shoplifters has a focal length of -35.0 cm. A person stands in an aisle 6.2 m from the mirror. Locate the person's image using the mirror equation.
17. A ray of light passes from air into glass ($n = 1.61$) at an angle of 23° . Find the angle of refraction.
18. Find the critical angle for diamond ($n = 2.42$).
19. The speed of light in a clear liquid is 2.35×10^8 m/s. What is its index of refraction?
20. The critical angle for a certain liquid air interface is 48.8° . What is the index of refraction of the liquid?
21. Monochromatic light of a wavelength of 625 nm enters water. What is the frequency of the light in water?
22. A glowing object 2.4 cm tall is placed 5.0 cm from a lens. If a virtual image is produced that is 4.0 cm tall, what is the focal length of the lens? What kind of lens is used?
23. A glowing object 4.0 cm tall is 9.0 cm from a convex lens. If the real image produced is 6.0 cm tall, what is the focal length of the lens?
24. A glowing object 5.0 cm tall is placed 4.3 cm from a concave lens. If the lens has a focal length of 4.5 cm, find the magnification of the object.
25. Yellow light shines on paper which appears cyan under white light. What color is observed?

Optics Review

26. Which color of the visible light spectrum has the greatest wavelength?
27. A red light and a green light are turned on and illuminate a sheet of white paper. What color will the paper appear?
28. What color of light will be reflected?



29. Light becomes partially polarized as it reflects off nonmetallic surfaces such as glass, water, or a road surface. The polarized light consists of waves vibrate in a plane that is _____ (parallel or perpendicular) to the reflecting surface.

Answers:

1. Virtual
2. Virtual, erect, same size as the object, left/right reversed
3. Real images are inverted and virtual images are erect.
4. 3.6 cm
5. 36 m^2
6. 4 m
13. 2.75
14. 80 cm
15. $d_i = -3.1 \text{ cm}$ and $h_i = 1.3 \text{ cm}$
16. -33 cm
17. 14°
18. 24°
19. 1.28
20. 1.33
21. $4.8 \times 10^{14} \text{ Hz}$
22. 12.6 cm, convex
23. 5.4 cm
24. 0.51
25. green
26. Red
27. Yellow
28. green
29. Parallel