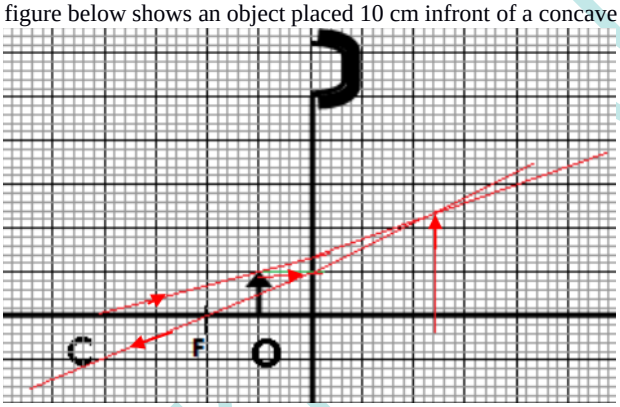
5. REFLECTION AT CURVED SURFACES

1. Define the following terms as used in curved mirrors.
   i) Principal focus (F).
   ii) Focal length (f)
2. State ONE application of each of the following
   a. Convex mirrors
   b. Parabolic mirrors
   c. Concave mirrors
3. Distinguish between a real and a virtual image.
4. What is meant by the term spherical abberation?
5. A boy scout wanted to light up his match stick using a curved mirror. State the type of mirror he should use and explain how?
6. Explain why a concave mirror is suitable for use as a make up mirror.
7. By use of a ray diagram, show how a concave mirror may be a dentist mirror.
8. Give **two** reasons why a convex mirror is used as a driving mirror.
9. State the reason why a convex mirror is preferred over a plane mirror for use as a driving mirror.
10. Draw a diagram to show how a convex mirror used in a shop give a large field of view.
11. State **one** advantage of using parabolic reflector in a headlamp of a car.
12. Show using a diagram how a parabolic reflector propagates parallel beam of light.
13. Using the object O and the mirrors below, show why convex mirror is preferred to plane mirror for use in supermarkets.

IMAGES

1. Distinguish between a real and a virtual image.
2. State characteristics of an image observed in a concave mirror when the object is between the focal point and the mirror.
3. What are the characteristics of the image formed when;
   a) An object is placed beyond the centre of curvature of a concave mirror?
   b) An object is placed between the principal focus and the pole of a concave mirror?
4. The figure below shows an object placed 10 cm infront of a concave mirror whose radius of curvature is 40 cm.



   i) Use the ray diagram to determine
      I) The image distance
      II) The magnification
   ii) State where the position of the image would be if the object had been placed at the principal focus
5. A real object of height 1 cm placed 50 mm from a concave mirror forms a virtual image 100 mm from the mirror. Determine the:
   (a) Image height
   (b) Magnification
6. An object **10 cm** high is placed **30 cm** in front of a concave mirror. The image is **45 cm** in front of the mirror. Find its magnification and size of the image.
7. A concave mirror of focal length **10 cm** forms a real image of height **5 cm** at a distance **20cm** behind the lens. Find by scale drawing the Position and size of the object.
8. An object placed **8cm** from a concave mirror is magnified **3** times. Calculate the image distance.
9. An object placed **15cm** from a concave mirror is magnified **twice**. Calculate the image distance.
10. An object placed **12 cm** from a concave mirror is magnified **3** times. Calculate the image distance.
11. A concave mirror has a focal length of **8 cm**. A real object of height **2 cm** is placed **12 cm** from the mirror. Calculate the distance of the image from the mirror. If the height of the image formed is **4 cm**.
12. The distance between an object and its magnified real image produced by a concave mirror is **20cm**. When the object is placed 10 cm from the pole of the mirror. Determine Linear magnification of the image.
13. You are provided with the following apparatus; A white screen, a metre rule and a concave mirror. Using the apparatus, describe an appropriate method of determining the focal length of the mirror.

Hold the mirror so that the reflecting surface faces a distant object like a window.
Move the white screen infront of the window until an inverted sharp image of the window is formed on it.
Measure the distance from the mirror to the screen.
The distance measured is approximately equal to the focal length of the mirror. This is as a result of parallel rays of light from a distant window being reflected at converging at the principal focus.

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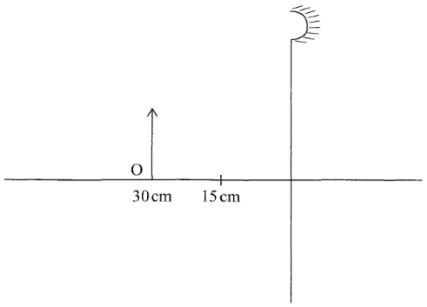
RANDOM QUESTIONS

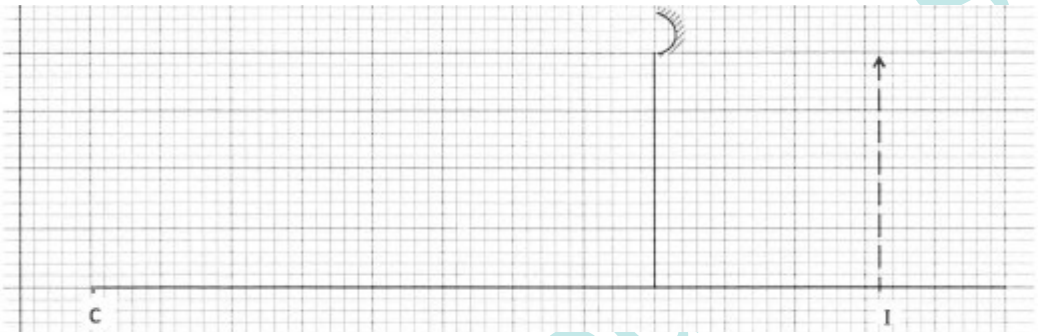
1. (a) Figure below shows an object O placed in front of a converging mirror of focal length 15 cm.



Draw on the figure a ray diagram to locate the image formed.

(b) State why parabolic reflectors are used in car headlights.

2. Figure below shows the image of an object formed by reflection in a converging mirror. C is the centre of curvature of the mirror.

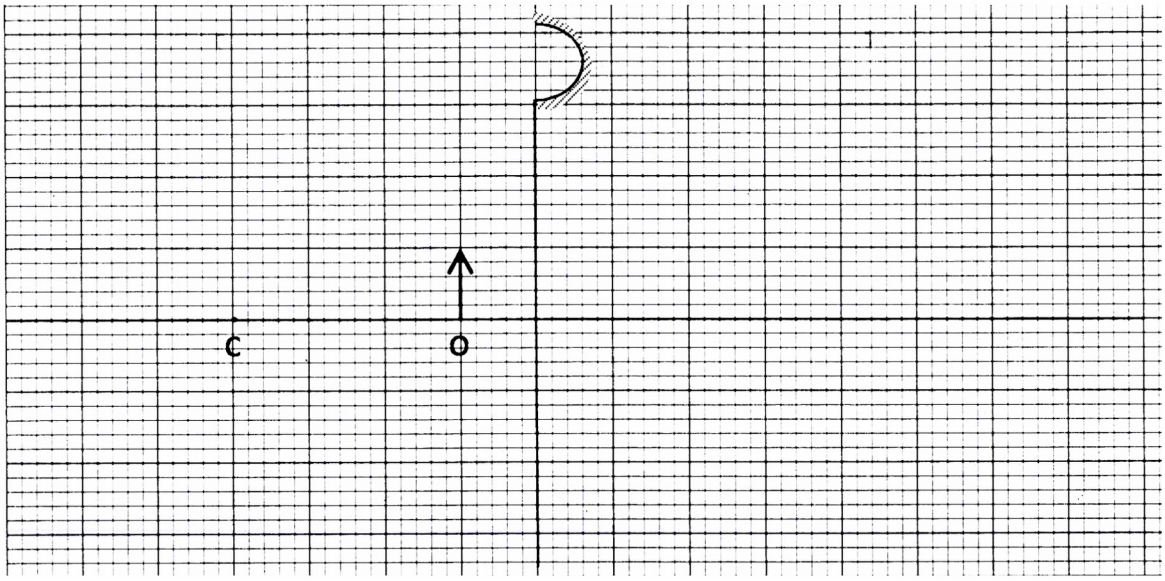


Complete the diagram to show:

(a) how incident rays are reflected to form the image;

(b) the object position.

3. Figure below shows an object placed 10 cm infront of a concave mirror whose radius of curvature is 40 cm.



(a) On the same figure, draw a ray diagram to show the position of the image formed.

(b) Use the ray diagram to determine:

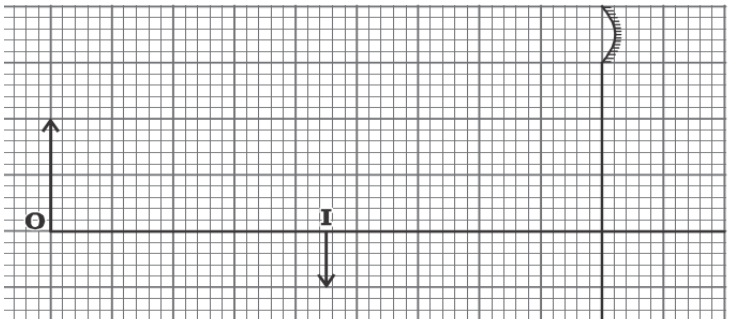
(I) the image distance.

(II) the magnification.

(c) State where the position of the image would be if the object had been placed at the principal of focus.

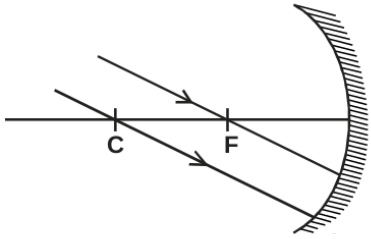
4. Describe how the focal length of a concave mirror can be determined using a screen and a metre rule.

5. The figure below shows an object O infront of a concave mirror and its image, I, formed after reflection.



On the same diagram draw appropriate ray(s) to locate the principal focus F, of the mirror.

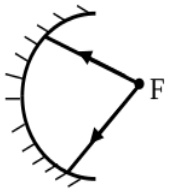
6. Figure below shows two parallel light rays incident on a concave mirror.



Sketch on the same diagram the path of the rays after striking the mirror and show the image.

7. State the disadvantage of using a convex mirror as a driving mirror

8. Figure below shows a parabolic surface with focal point F. A small source of light is placed at F.

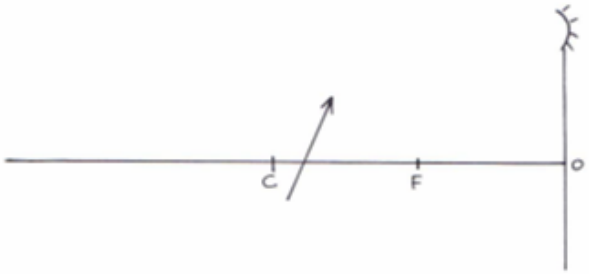


Complete the ray diagram to show how the incident rays are reflected by the surface.

9. An object of height 2 cm is placed 25 cm in front of a concave mirror. A real image is formed 75 cm from the mirror. Calculate the height of the image.

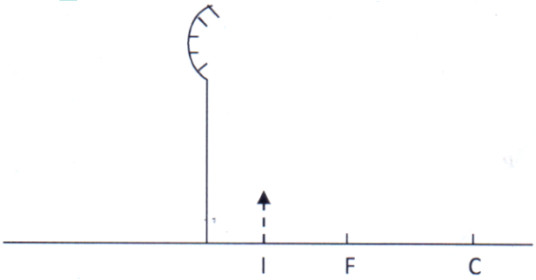
10. State one difference between an image formed by a pinhole camera and the viewed through a magnifying glass.

11. Figure below shows an object placed infront of a concave mirror.



Use rays to locate the position of the image.

12. Figure 5 shows the image formed by convex mirror



Sketch rays on the diagram to show the position of object.

13. An object O is placed in front of convex mirror as shown in the diagram below.

Complete the diagram to locate the position of the image,

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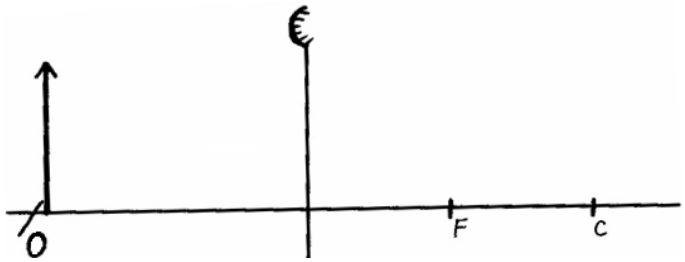
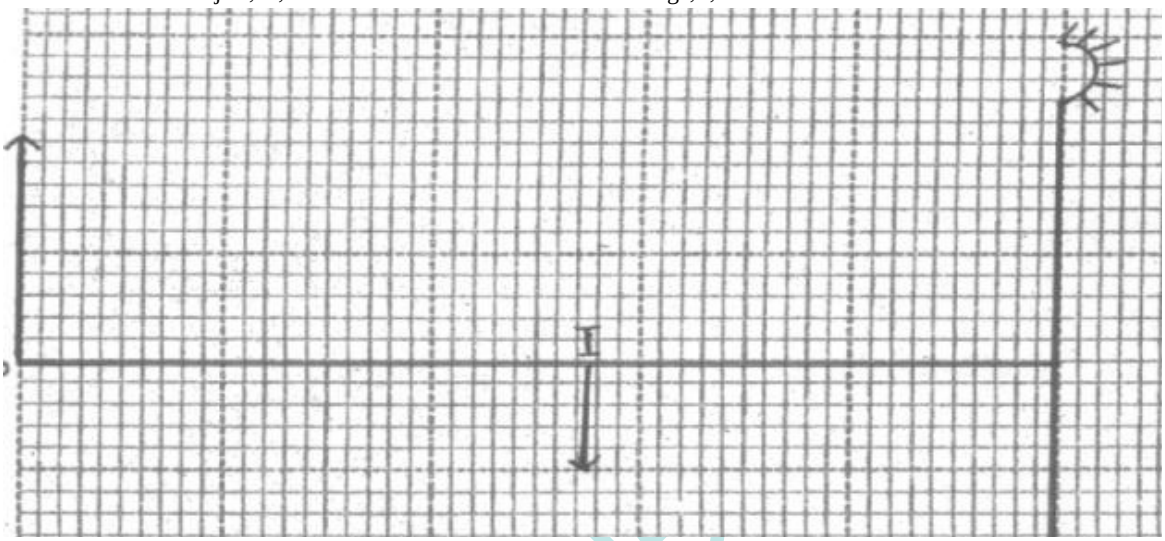
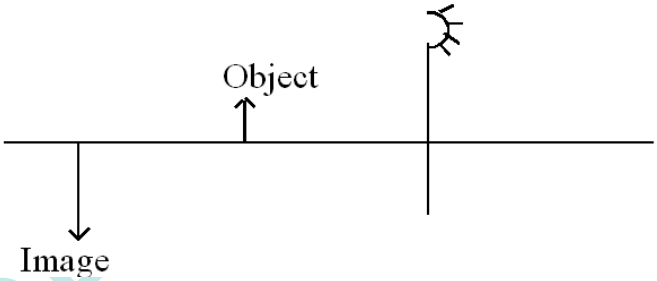


14. A student holds a large concave mirror of focal length 1 m, 80 cm from her face. State two characteristics of her image in the mirror.
15. The figure below shows an object, O, in front of a concave mirror and its image, I, formed after reflection.

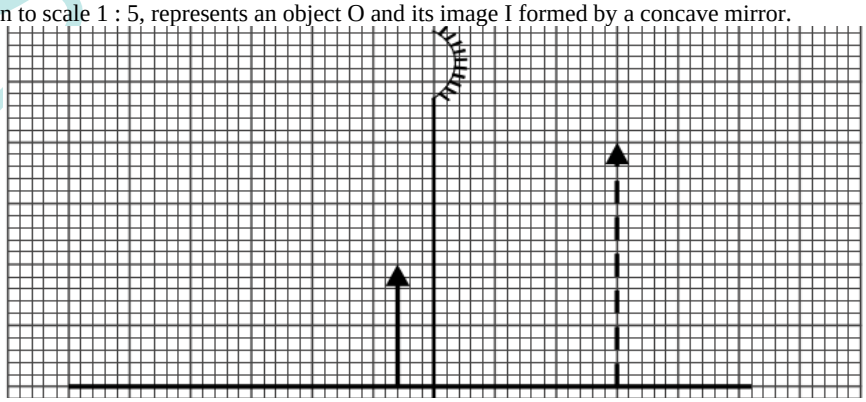


16. a) On the same diagram draw an appropriate ray(s) to locate the principal focus, F, of the mirror.
    b) Determine the focal length of the mirror
17. Figure below shows an object infront of concave mirror and it's image.



Locate position of its principal focus.

18. A lady holds a large concave mirror of focal length 80 cm, 60 cm from her face. State two characteristics of her image in the mirror
19. The figure which is drawn to scale 1 : 5, represents an object O and its image I formed by a concave mirror.



By drawing suitable rays, locate the mark on the figure the position of the principal focus F of the mirror.