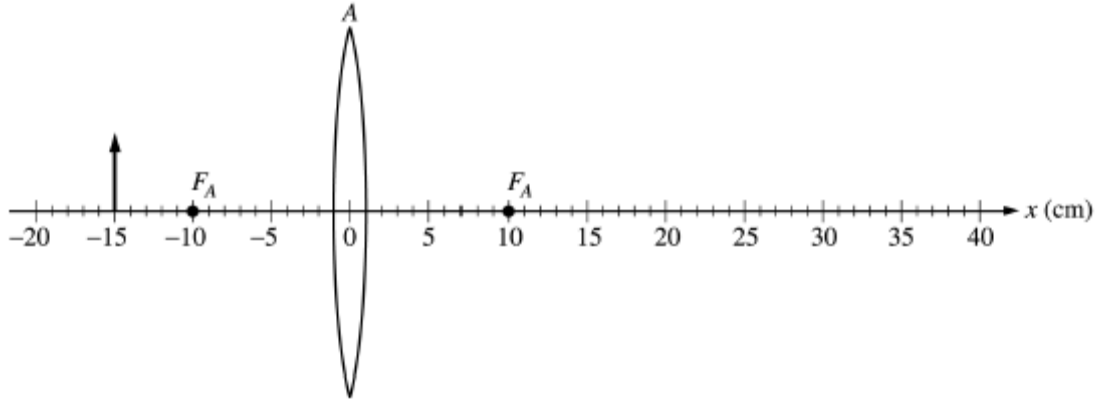
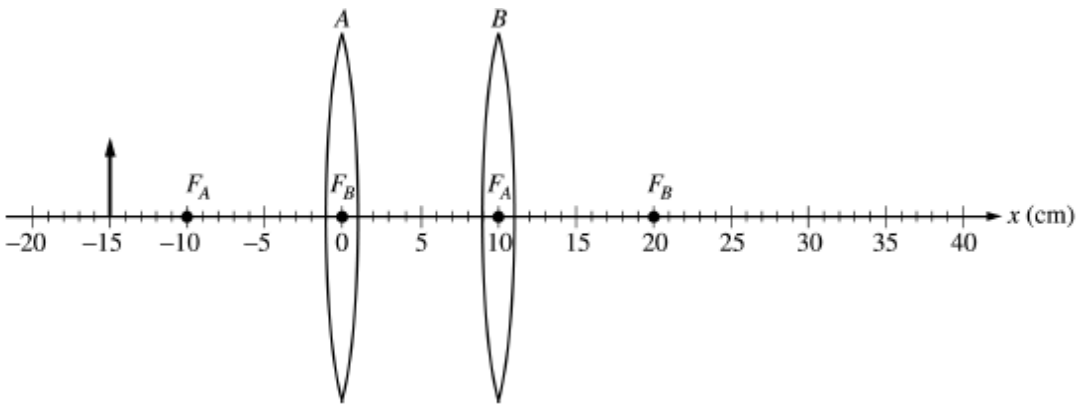


AP 2 Optics: Compound Lens ws 5



1. A thin convex lens A of focal length $f_A = 10$ cm is positioned on an x -axis as shown above. An object of height 5 cm, represented by the arrow, is positioned 15 cm to the left of lens A .

- (a) On the figure above, draw necessary rays and sketch the image produced by lens A .
- (b) Calculate the location of the image produced by lens A .
- (c) Calculate the height of the image produced by lens A .



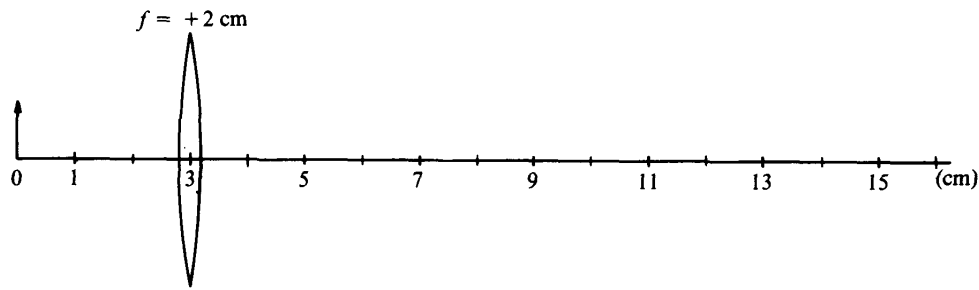
A second thin convex lens B of focal length $f_B = 10$ cm is now positioned 10 cm to the right of lens A , as shown above.

- (d) Determine the location on the x -axis given above of the final image produced by the combination of lenses.
- (e) Check the appropriate spaces below to indicate the characteristics of the final image produced by the combination of lenses.

inverted larger than the original object
 upright smaller than the original object

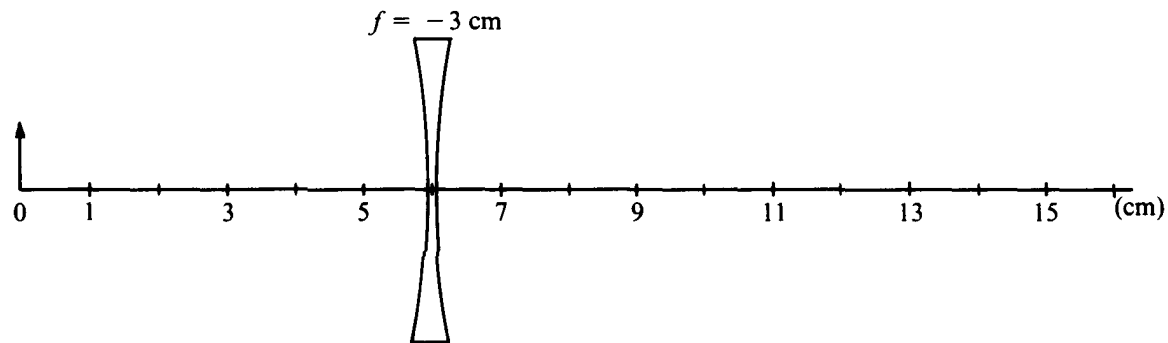
Explain your answers.

2. An object is placed 3 centimeters to the left of a convex (converging) lens of focal length $f = 2$ cm, as shown below.



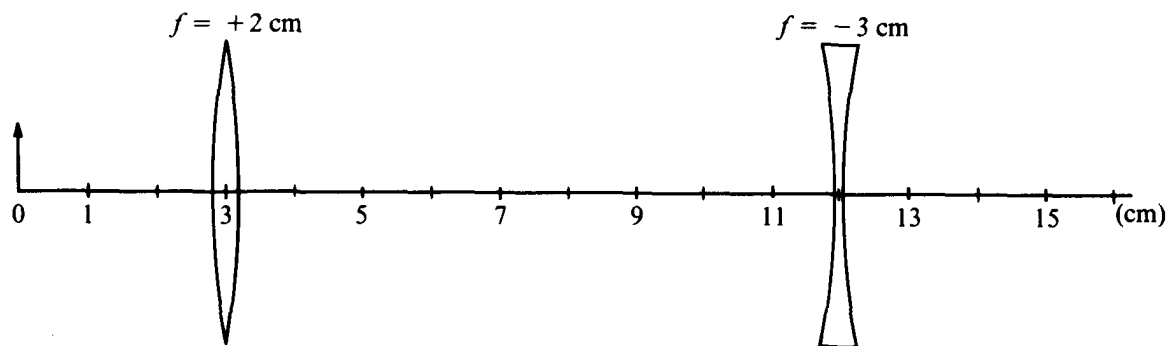
- Sketch a ray diagram on the figure above to construct the image. It may be helpful to use a straightedge.
- Determine the ratio of image size to object size.

The converging lens is removed and a concave (diverging) lens of focal length $f = -3$ centimeters is placed as shown below.



- Sketch a ray diagram on the figure above to construct the image.
- Calculate the distance of this image from the lens.
- State whether the image is real or virtual.

The two lenses and the object are then placed as shown below.



- Construct a complete ray diagram to show the final position of the image produced by the two-lens system.