An object is 16.0 cm to the left of a thins lens. The lens forms an image 36.0 cm to the right of the lens.

a) What is the focal length of the lens? Is the lens converging or diverging?

b) If the object is 8.00 mm tall, how tall is the image? Is it erect or inverted?

c) Draw a principal-ray diagram.

You are given the thin lens formula \( \frac{1}{s} + \frac{1}{s'} = \frac{1}{f} \). You can use \( m = -\frac{s'}{s} \) to find the size and orientation of the image. The sign of \( f \) determines whether the lens is converging or diverging.

\( s = 16.0 \text{ cm} \). \( s' = +36.0 \text{ cm} \).

(a) \[ f = \frac{ss'}{s + s'} = \frac{(16.0 \text{ cm})(36.0 \text{ cm})}{16.0 \text{ cm} + 36.0 \text{ cm}} = 11.1 \text{ cm} \] \( f > 0 \) and the lens is converging.

(b) \[ m = -\frac{s'}{s} = -\frac{36.0 \text{ cm}}{16.0 \text{ cm}} = -2.25 \]. \[ |y'| = |m|y = (2.25)(8.00 \text{ mm}) = 18.0 \text{ mm} \]. \( m < 0 \), so the image is inverted.

c) The image is real so the lens must be converging.