For the diverging lens:

$$\frac{1}{q} = \frac{1}{f} - \frac{1}{p} = \frac{1}{-10.0\text{ cm}} - \frac{1}{12.5\text{ cm}} = -\frac{22.5}{125\text{ cm}}$$

$$\boxed{q = -5.56\text{ cm}}$$

$$M = -\frac{q}{p} = -\frac{-5.56\text{ cm}}{12.5\text{ cm}}$$

$$\boxed{M = 0.445}$$

4. EVALUATE These values and signs for the converging lens indicate a real, inverted, smaller image. This is expected because the object distance is longer than twice the focal length of the converging lens. The values and signs for the diverging lens indicate a virtual, upright, smaller image formed inside the focal point. This is the only kind of image diverging lenses form.

PRACTICE B

Lenses

1. An object is placed 20.0 cm in front of a converging lens of focal length 10.0 cm. Find the image distance and the magnification. Describe the image.
2. Sherlock Holmes examines a clue by holding his magnifying glass at arm's length and 10.0 cm away from an object. The magnifying glass has a focal length of 15.0 cm. Find the image distance and the magnification. Describe the image that he observes.
3. An object is placed 20.0 cm in front of a diverging lens of focal length 10.0 cm. Find the image distance and the magnification. Describe the image.
4. Fill in the missing values in the following table.

	f	p	q	M
	Converging lens			
a.	6.0 cm	?	−3.0 cm	?
b.	2.9 cm	?	7.0 cm	?
	Diverging lens			
c.	−6.0 cm	4.0 cm	?	?
d.	?	5.0 cm	?	0.50