Substitute the values for p and q to find the magnification of the image.

$$M = -\frac{q}{p} = -\frac{-4.44 \text{ cm}}{10.0 \text{ cm}}$$

$$\boxed{M = 0.444}$$

Substitute the values for p, q, and h' to find the height of the object.

$$h = -\frac{p}{q}h' = -\frac{10.0 \text{ cm}}{-4.44 \text{ cm}} (2.50 \text{ cm})$$

$$\boxed{h = 5.63 \text{ cm}}$$

PRACTICE C

Convex Mirrors

1. The image of a crayon appears to be 23.0 cm behind the surface of a convex mirror and is 1.70 cm tall. If the mirror's focal length is 46.0 cm, how far in front of the mirror is the crayon positioned? What is the magnification of the image? Is the image virtual or real? Is the image inverted or upright? How tall is the actual crayon?

2. A convex mirror with a focal length of 0.25 m forms a 0.080 m tall image of an automobile at a distance of 0.24 m behind the mirror. What is the magnification of the image? Where is the car located, and what is its height? Is the image real or virtual? Is the image upright or inverted?

3. A convex mirror of focal length 33 cm forms an image of a soda bottle at a distance of 19 cm behind the mirror. If the height of the image is 7.0 cm, where is the object located, and how tall is it? What is the magnification of the image? Is the image virtual or real? Is the image inverted or upright? Draw a ray diagram to confirm your results.

4. A convex mirror with a radius of curvature of 0.550 m is placed above the aisles in a store. Determine the image distance and magnification of a customer lying on the floor 3.1 m below the mirror. Is the image virtual or real? Is the image inverted or upright?

5. A spherical glass ornament is 6.00 cm in diameter. If an object is placed 10.5 cm away from the ornament, where will its image form? What is the magnification? Is the image virtual or real? Is the image inverted or upright?

6. A candle is 49 cm in front of a convex spherical mirror that has a focal length of 35 cm. What are the image distance and magnification? Is the image virtual or real? Is the image inverted or upright? Draw a ray diagram to confirm your results.