

## Chapter 27

# Determining Image Size and Distance

- 27.1 (a) Object distance is +20 cm and the image distance is  $-10$  cm,  
(b) object distance is +20 cm and the image distance is +10 cm
- 27.2 (a) Left of the lens and object for [a], infinitely far away for [b],  
right of the lens for [c], at point P for [d], (b) because they never  
converge to a point (or appear to diverge from a point) unless the  
point is infinitely far away
- 27.3 20 cm from the lens
- 27.4 Converging
- 27.5 5 diopters
- 27.6 Infinitely far away
- 27.7 The image of the mountains will be about 20 cm away from the  
lens (42 cm away from your eye) and will appear smaller than the  
mountains (as seen without the lens)
- 27.8 (a) They would be equal, (b) yes
- 27.9 There are several ways to do this. I present one way here. First,  
multiply both sides by  $h_i/f$  (this helps with the algebra in the

next step). Then use equation (27.1) to replace  $(h_i/h_o)$  in terms of  $d_i$  and  $d_o$ . After simplifying, you should be able to divide through by  $d_i$  and rearrange to get equation (27.3).

27.10 (a) 10 cm, (b) from the mirror

27.11 (a) +0.5, (b) that  $(d_i/d_o) = -0.5$ , (c) that  $d_o - d_i = 20$  cm, (d)  $d_o = 13.3$  cm and  $d_i = -6.7$  cm, (e)  $-13.3$  cm

27.12 (a) 3.01 cm, (b) 2.05 cm, (c) if image is real then  $d_o = 15.8$  cm and  $d_i = 2.9$  cm, and if image is virtual then  $d_o = 2.0$  cm and  $d_i = -10.9$  cm

27.13 (a) 10 cm to the left of the right lens, (b) 6.7 cm to the right side of the right lens