

Problems for chapter 23

1, 3, 4, 7, 10, 11, 12, 16, 20, 22, 23, 24, 25, 26, 28, 30, 32, 36, 37, 39, 43, 45, 49, 50, 52, 53, 58, 61, 66, 69, 71, 73, 74, 79, 83, 86, 89

Answers to even-numbered problems:

Chapter 23

2.
4. 76 cm
6.
8. 11.5 cm
10. 4.2 m
12. convex, -19.7 m
14. -6.0 m
16. convex, -36.0 cm
18.
20. -4.1 m
22. concave, erect and virtual, 161 cm
24. 1.31
26. 34 degrees
28. 43.4 degrees
30. 26.9 degrees, 31.2 degrees, 31.2 degrees
32. 60.5 degrees
34.
36. 61.7 degrees, Lucite
38. 70.7 cm
40. ≥ 1.414
42. 1.414, not totally reflecting, 1.88
44. Converging, 5.41 D
46. 4.88D, converging; -16.0 cm, diverging
48. -7.9 cm, 2.33 mm upright
50. Virtual, converging, 7.5D
52. 50 cm
54. -25.0 mm, -75.0 mm
56. 37 m
58. -0.713 (inverted)
60. -10.0 cm
62. 50.0 cm from 15.0 cm lens
64. 10 cm right of diverging lens, -1.0,
66. -27.0 cm
68. -11.7 cm (concave)
70. 26 cm
72. a) 3 m, 4 m, 7 m, b) toward you, away from you, toward you
74. 53.7 degrees
76.
78. they chose different signs for the magnification, 13.3 cm, 26.7 cm
80.
82.
84. 9.9 cm
86. 45 cm
88. -10.8 cm, diverging, virtual
+205 cm, converging, virtual
90. 19 cm
92.