Assignment 2

1. A fisherman 2 meters from shore sees a fish directly below. His partner on shore also sees the fish and measures an angle of 45° for the light ray from the fish exciting the water surface. How deep should the fisher in the boat quickly cast his net to catch the fish?

2. Consider a 1 cm high object placed in front of a lens having a focal length of 5 cm. For object positions of 20, 7.5 and 2.5 cm, find:
   a) the image position
   b) the magnification
   c) draw a neat diagram showing the directions of the light rays
   d) Is the image real or virtual?

3. Repeat question 2 for the same object if it is placed 20 cm in front of a concave lens having a focal length of 5 cm.

4. Explain using a diagram what farsightedness is and how it is corrected with glasses.

5. A laser beam having a diameter of 2 mm is to be expanded by a factor of 4. Draw a diagram of how one can create a beam expander using two convex lenses. Specify the focal length of the lenses and their positions using a diagram.