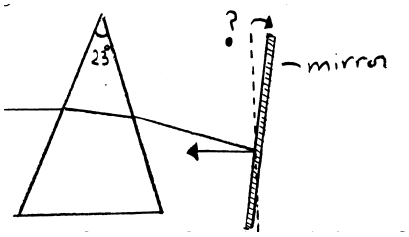
Physics 2P51 Assignment 1

Due: Friday, January 31, 2020 in class.

1. A horizontal ray of white light passes through a prism of apex angle 23^o whose refractive index is 1.7 for blue light. Assume the bisector of the apex angle lies along the vertical. The light then strikes a vertical mirror as shown by the dashed line.



   (a) Through what angle must the mirror be rotated if after reflection a blue ray is to be horizontal? Assume the index of the outside medium is one.

   (b) If the refractive index is 1.6 for red light what is the angular dispersion between red and blue rays exiting the prism?

2. (a) When an object is placed 15 cm in front of a thin lens, a virtual image is formed 5.0 cm away from the lens. What is the focal length of the lens?

   (b) What is the transverse magnification of the object?

   (c) Make an accurate ray diagram to show that your results of (a) and (b) are correct.

   (d) A converging lens with a focal length of magnitude 6 cm is placed 4 cm to the right of the first lens. Calculate the location of the final image.

   (e) Check that your result for part (d) is correct by using graphical ray tracing to find the final image. [You may use the same diagram as in part (c)].