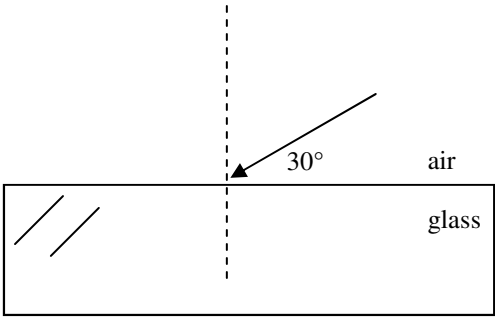
A-day: Due Mon., Mar 23
B-day: Due Tues., Mar 24

2009 Light 7

Name: _____

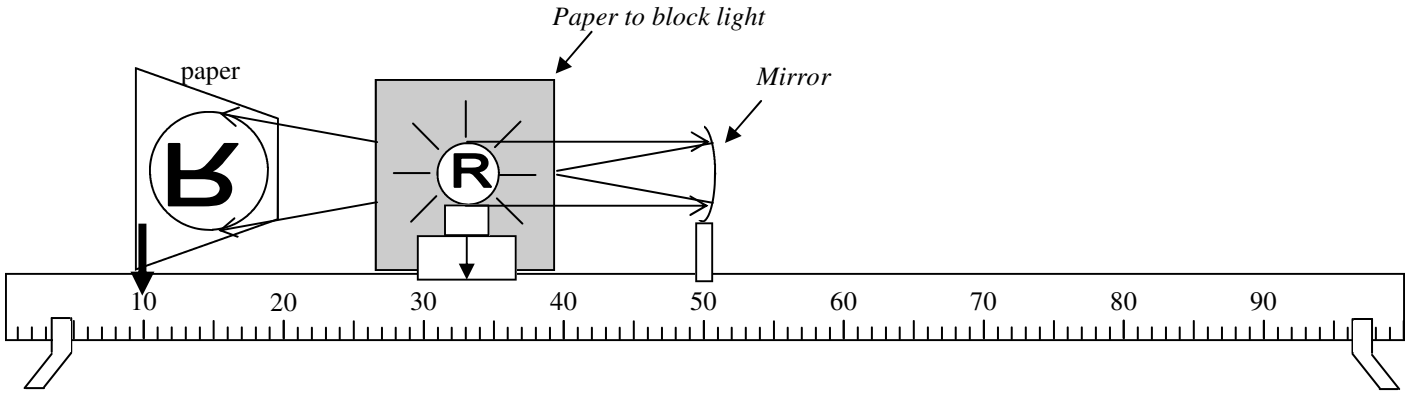


From "Refraction" Notes:

1. Use the diagram at the right to answer the following questions.
   A. Which is the first substance light is traveling in?
   B. For Snell's Law ($n_1\sin\theta_1 = n_2\sin\theta_2$), n_1 is air or glass?
   C. If all angles must be from the normal, what is θ_1?
   D. Does light speed up or slow down as it passes into the glass?
   E. What is the same for light as it passes into glass?
   F. Draw what will happen to the light in the glass AND after it passes all the way thru the glass.
   G. Find the angle of refraction in glass.

2. Find the speed of light in ice.

3. For substance A, n = 2.45; substance B n = 1.65.
   A. Which one is denser?
   B. In which substance will light have the fastest velocity?



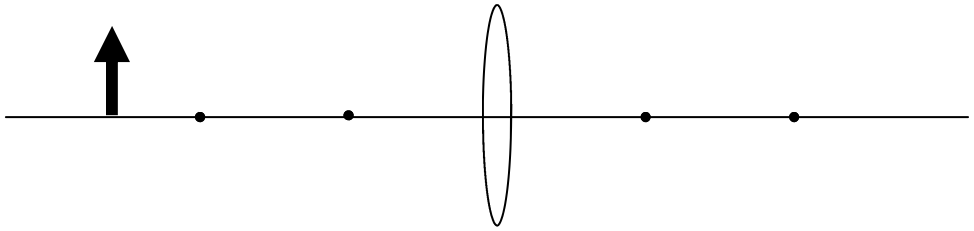
From "Lens Equation" notes and "Ray Diagrams notes:

4. The above diagram shows a mirror producing an image on a piece of paper. The arrows show the positions of the light source and the paper.
   A. Is it a real or virtual image?
   B. Why?
   C. Do the light rays cross after reflecting off the mirror?
   D. Is it convergent or divergent?
   E. Which side of the mirror is real?
   F. On the diagram show p, q, h, and h'. Be sure to mark them as + or −.
   G. Calculate the focal length of the mirror.

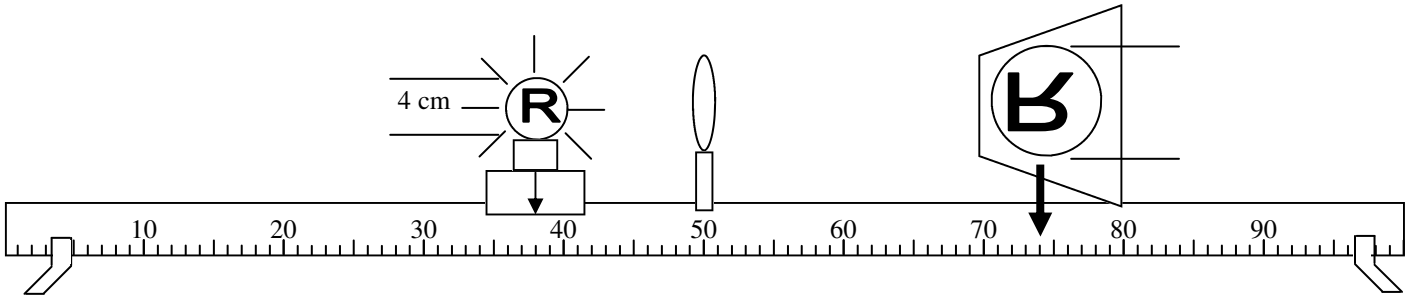
   H. What is C for this mirror?
   I Mark f and C on both side of the mirror.
   J. Is p greater than C, less than C, or at C?
   K. Is q greater than C, less than C, or at C?
   L. Calculate the magnification of the mirror.
   M. If the object is 4 cm tall, how big is the image?

   N. To make the image smaller, which way would you move the object?

_____ Lens



5. Use your "Ray Diagram" notes for the above diagram.
   A. Label what kind of lens is it.
   B. Is it convergent or divergent?
   C. Label f and C on both sides.
   D. Circle the actual focal point for this device.
   E. Use a straight edge to draw the rays and find the image.
   F. Is the image real or virtual?
   G. Is the image magnified or reduced?
   H. The object is outside of C and the image is located where?
   I. On the diagram label p, q, h, and h', being sure to mark them as + or −



The above diagram you should understand from the lab.

6. A. Label p, q, h, and h' on the diagram above.
   B. Is the image real or virtual?
   C. Is the image magnified or reduced?
   D. Will the value of (the number for) M be + or −?
   E. Is the image on the real or virtual side of the lens?
   F. Calculate the focal length.

   G. What is the radius of curvature for this lens?
   H. Label f and C on the diagram on both sides.
   I. Calculate the magnification.
   J. Calculate the height of the image.

   K. To make the image bigger, which way would you move the object?
   L. Where is the object in relation to C and f?
   M. Where is the image in relation to C and f?

Using "Optics Basics" and "Lens Equation" notes:

7. A divergent lens has a focal length of 6 cm. The object is 8 cm from the lens and is 5 cm tall.
   A. Is it a concave or convex lens?
   B. Does it have a real or virtual focal point?
   C. So f will be + or − in the lens equation?
   D. Thinking about the large mirrors we looked at, will the image be magnified or reduced?
   E. Calculate q.
   F. Calculate M
   G. Calculate the height of the image.