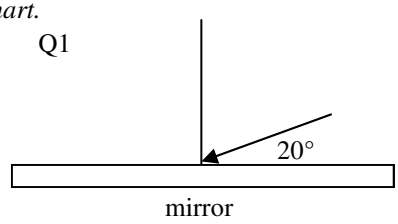
A-day. Due Thurs., Mar 1 (Assigned Tues., Feb 27)
B-day: Due Fri., Mar 2 (Assigned Wed., Feb 28)

Light 7

On the back of your variable sheet write the "Optics Square" and the "Prefixes" chart.

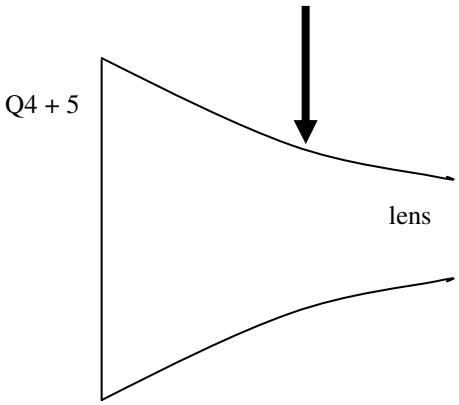
1. What is the angle of reflection for the diagram at the right? (And draw it).
2. Using the RGB model for color:
   A. What is the background color? ____ B. How would you make white? ____
   C. How would you make magenta? ____ D. How would you make Red? ____
   E. How would you make black? ____

Q1



3. Using the CMYK model for color:
   A. What is the background color? ____ B. How would you make white? ____
   C. How would you make cyan? ____ D. How would you make Blue? ____
   E. How would you make black? ____

Q4 + 5



4. Using the graphic at the right, show what will happen to the light ray as it passes thru the glass lens. (*Make sure it goes all the way thru; think about the path and which side is faster, etc*.)
   What kind of lens is it in the graphic?

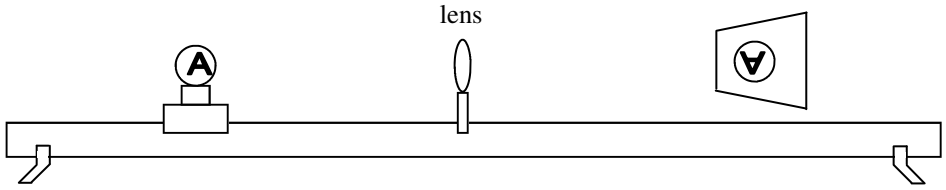
5. A light ray is traveling at 20° in water.
   A. Does light travel faster or slower in air?
   B. What is the index of refraction for water? _____ air? _____
   C. At what angle will it travel if it passes into air?

   D. Does the ray bend toward or away from the normal?
   E. What is the index of refraction for glass? _____
   F. Will it bend towards or away from the normal is it passes into glass instead of air?
   (Here's room to prove it if you need to.)

6. Find the critical angle for light passing from glass to air.

7. What is the critical angle of light passing from air to glass?

8. On the graphic below,
   A. Mark p, q, h, and h'.
   B. Label what kind of lens it is.
   C. Since p = q, mark the focal length and radius of curvature on the meter stick with dots labeled "f" and "C".
   D. Real or virtual image?
   F. + or –: p ____; q ____; f ____; h ____; h' ____.
   G. Determine the magnification of the lens.



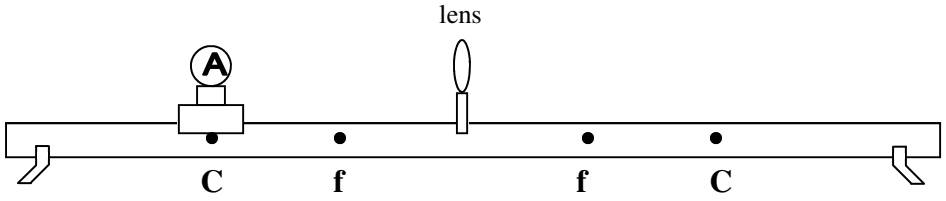
9. A 4 cm object is 6 cm in front of a *concave* lens with a radius of curvature of 10 cm.
   A. Find the distance to the image.

   B. Find the height of the image.

   C. Find the magnification.

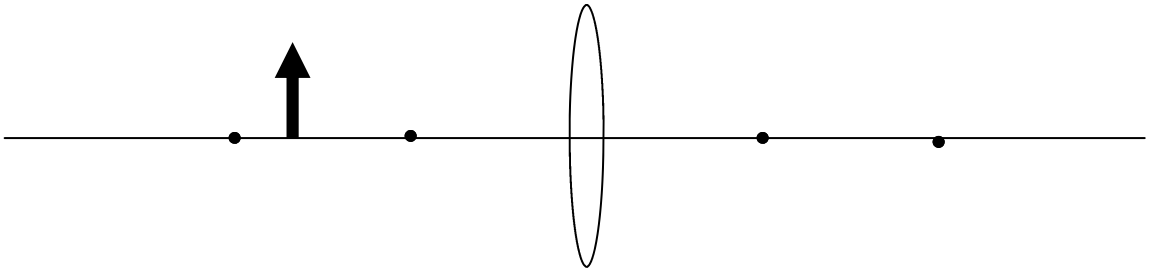
   D. Is it a real or virtual image?

Light 7

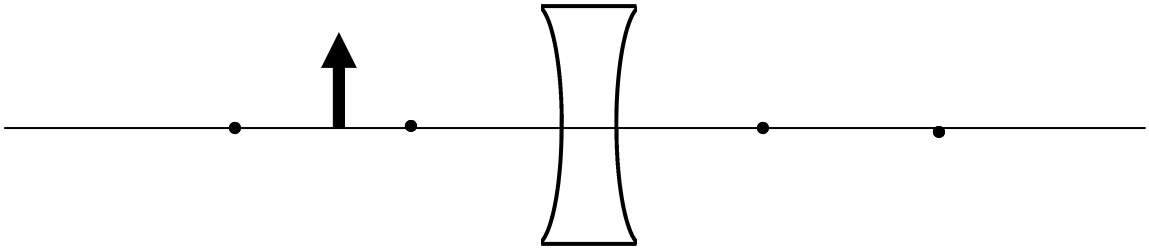


10. Use the above setup to answer the following questions.
    A. Label the object.
    B. Will the image be real or virtual?
    C. Will the image be magnified, reduced, or 1 (same size)?
    D. Which way would you move the object to decrease the size of the image?
    E. Draw where you think the image might be.
    F. What would happen if you put the object at the focal point?

11. Draw the ray diagram for the following _____ lens.



12. Draw the ray diagram for the following _____ mirror.

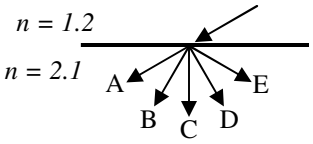


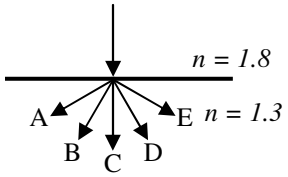
13. If a radio wave has a wavelength of 4.5 m, find its frequency.

Material	n
Cubic zirconia	2.2
Zircon	1.923
Quartz	1.458
Sodium Chloride	1.544

14. If light is travels 2.06 x 10^8 m/s in a crystal substance. Figure out what substance it is. (See the chart at the right.)

15. What is "Sodium Chloride"?
16. In which substance on the chart will light's speed be the slowest?
17. Use the diagrams at the right to figure out where light will go.





Bonus:

18. A diffraction gradient has 450 lines per millimeter. If you use a laser with 650 nm light, find the angle to the second minimum.