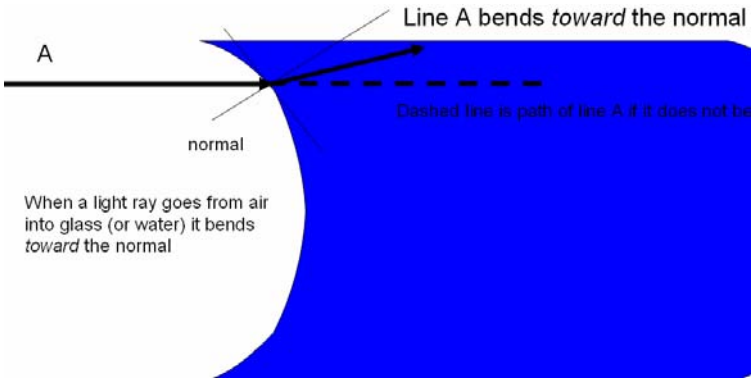
Note: In class I went over problems 17 and 20. Here is some details of the diagram that I put on the chalkboard.

17.In Figure 2, what happens to beam A when it enters the glass?

a) It continues straight
b) It bends up
c) It bends down
d) It reflects back
e) It reflects up

See the following figure or the lecture notes to see how to zoom in on a surface and then use the principles of optics to tell you which way the light will bend.



18.In Figure 2, what happens to beam C when it arrives at the glass?

a) It bends down and to the right
b) It reflects up and to the left
c) Both of the above
d) Both of the below
e) It bends up and to the right
f) It bends down and to the right

19.Does any of the light from Beam A in Figure 2 get reflected?

a) Yes, down and to the left
b) Yes, up and to the right
c) Yes, up and to the left
d) No

20. In Figure 2, if the light area represents glass and the dark area represents air, what happens to beam A when it enters the air from the glass (beam A is still going from left to right)?

a) Continues straight
b) Bends up
c) Bends down
d) Reflects along same direction

In class I skipped this problem because the wording did not make it clear that beam A was still coming from left to right. Below is a diagram that helps answer this question. I have reversed the colors in Figure 2 to emphasize that the light ray (beam) is going from glass to air. The optics rule that you should remember is that when a ray from air is incident on a surface such as glass or water at an angle to the normal, the ray bends towards the normal. If the ray is going from glass or water to air, the ray bends away from the normal. In the lecture notes I show this pictorially with a flat surface. To draw the normal line for a curved surface, zoom in until the surface looks almost flat. Zooming in makes the surface look flat in that same way that from space, an astronaut would say the Earth looks curved. If he zooms in with a cameral or comes back home, he would say the Earth looks flat.