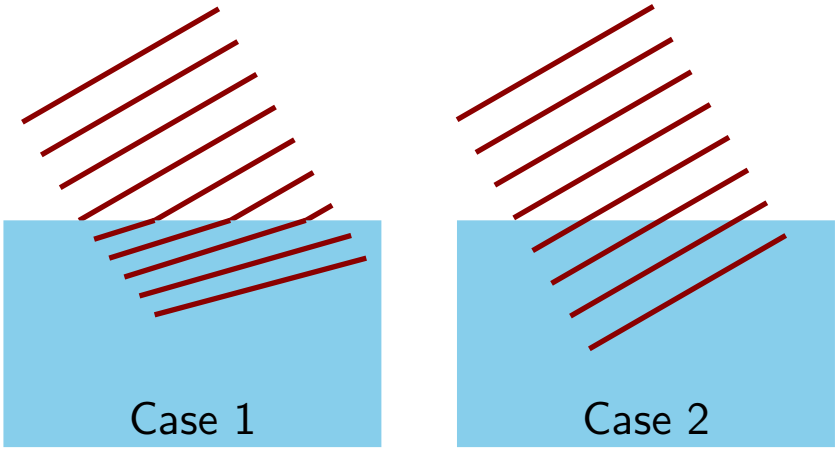
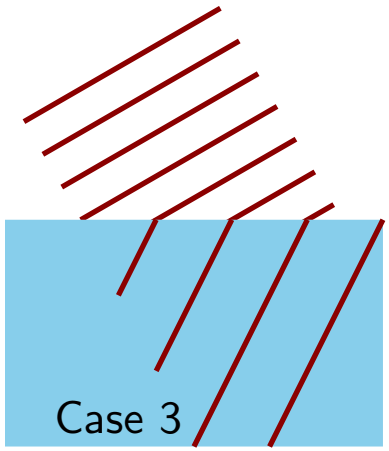
Question 1

Light passes from air into water. Light travels at a smaller speed in water than in air. Which of the following is possible for the waves?





Warm Up Question 1

A beam of light travels from water (higher index of refraction) into air (lower index of refraction). Consider the angle between the incident beam and the surface of the water versus the angle between the refracted beam and the water. How do these angles compare (e.g. same, incident larger, etc,...)? Explain your answer.

1. Refracted (air) larger. Use Snell's law $n_1 \sin\theta_1 = n_2 \sin\theta_2$.
2. Refracted (air) larger. Light bends toward normal when going from higher to lower.
3. Refracted (air) smaller. Light bends away from normal when going from higher to lower.
4. Refracted (air) smaller. Easier to travel through air.
5. Same.

Question 2

The indices of refraction for various substances are given below:

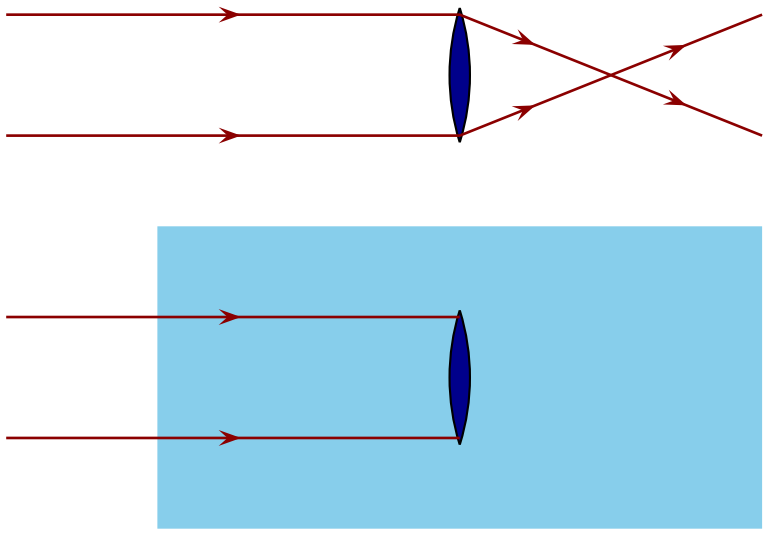
Air	1.00
Water	1.33
Benzene	1.50

Which of the following is/are true?

1. θ_c for the air/benzene combination is the same as that for the air/water combination.
2. θ_c for the air/benzene combination is larger than that for the air/water combination.
3. θ_c for the air/benzene combination is smaller than that for the air/water combination.

Question 3

A lens focuses incoming parallel light rays in air as illustrated. The lens is then immersed in water a parallel light rays enter it. The index of refraction of water is 1.33 and for this glass 1.50.



Inside the water, the rays are focused:

1. closer to the lens
2. further from the lens
3. at the same point as in the air.