

Quiz 7

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

1. White light, made up of all visible wavelengths of light, is incident on a prism in the form of an equilateral triangle. The index of refraction of red light for the prism is **less** than that for blue light. Which color of light will exit the prism at a **larger** angle relative to the incident angle?

- blue
- red
- they will have the same angle
- cannot be determined without knowing the incident angle

Snell's law tells us that the degree that the light is 'bent' scales with the index of refraction - larger index, more bending. That means blue in this case.

2. An object is placed to the left of a converging lens. Which of the following statements are true and which are false?

1. The image is always to the right of the lens
2. The image can be upright or inverted
3. The image is always smaller or the same size as the object

- 1 and 2 are true, 3 is true
- 2 and 3 are false, 1 is true
- 1 and 3 are false, 2 is true
- 2 and 3 are true, 1 is false

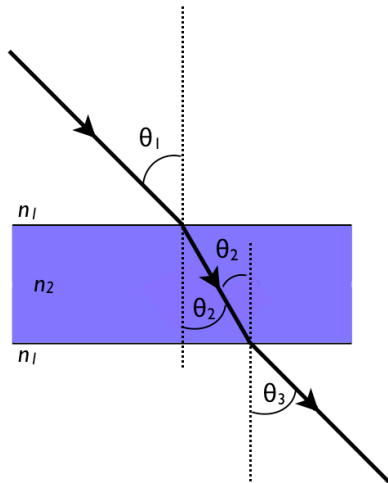
The image can be virtual if $p < f$, placing the image to the left of the lens. The image can be enlarged in this situation, which makes both 1 and 3 false. The image can be upright or inverted, depending on whether p is inside or outside the focal point.

3. As light travels from a vacuum ($n=1$) to a medium such as glass ($n>1$), which of the following properties remains the same?

- wavelength
- wave speed
- frequency
- none of the above

This one is just geometry really. No knowledge of optics required.

Name _____



4. A light beam traveling through a transparent medium of index of refraction n_1 passes through a thick transparent slab with parallel faces and an index of refraction n_2 . Which expression correctly gives the angle θ_3 ?

- $\sin^{-1}(n_1 \sin \theta_2)$
- θ_2
- $\sin^{-1}(n_2 \sin \theta_2)$
- θ_1