In photography fixed focal length means that the focal length is not adjustable. Photographers are unable to zoom in and out on a particular subject when using such a lens. Not being able to easily zoom in on a subject might seem like a huge disadvantage. But such lenses are credited with being able to produce much higher quality pictures in controlled settings.

In order for a film camera with a fixed focal length F to focus on an object located a distance x from the lens, the film must be placed a distance y behind the lens. F, y, and x are related as follows



Now suppose a camera has a lens with focal length F = 65.

1. Explain what happens to the focusing distance y as the object moves far away from the lens.
2. Explain what happens to the focusing distance y as the object moves closer and closer to the lens.
3. In general, why is it not possible to cross a vertical asymptote?