

44. (a) A parallel ray of light focuses at the focal point behind the lens. In the case of farsightedness we need to bring the focal point closer. That is, we need to reduce the focal length. From problem 29, we know that we need to use a converging lens of certain focal length  $f_1 > 0$  which, when combined with the eye of focal length  $f_2$ , gives  $f = f_1 f_2 / (f_1 + f_2) < f_2$ . Similarly, we see that in the case of nearsightedness we need to do a similar computation but with a diverging ( $f_1 < 0$ ) lens.
- (b) In this case, the unaided eyes are able to accommodate rays of light coming from distant (and medium-range) sources, but not from close ones. The person (not wearing glasses) is able to see far (not near), so the person is farsighted.
- (c) The bifocal glasses can provide suitable corrections for different types of visual defects that prove a hindrance in different situations, such as reading (difficult for the farsighted individual) and viewing a distant object (difficult for a nearsighted individual).