Solutions to Chapter 28 Exercises

3. Only light from card number 2 reaches her eye.



- 5. Light that takes a path from point A to point B will take the same reverse path in going from point B to point A, even if reflection or refraction is involved. So if you can't see the driver, the driver can't see you. (This independence of direction along light's path is the "principle of reciprocity.")
- 14. The minimum length of a vertical mirror must be half your height in order for you to see a full-length view of yourself. This is because the light from your feet that reaches your eyes via the mirror meets the mirror halfway up to your eyes. Then its angle of incidence (from your feet) equals the angle of reflection (to your eyes). Likewise, light from the top of your head meets the mirror halfway down to your eyes to reflect at the same angle to reach your eyes. Halfway up and halfway down means you can see all of yourself with a mirror that is half your height (and half your width).



- 34. You are seeing skylight refracted upward near the road surface.
- 46. Cover half the lens and you cut out half the illumination of the light. But you don't cut out half the image, as is commonly and mistakenly thought. (This incorrect thinking, unfortunately, may be fostered by ray diagrams, which are useful for locating image positions, but not for defining image formation.)
- 47. The image will be dimmer, but otherwise unaffected.
- 57. Yes, the images are indeed upside down! The brain re-inverts them.