## Solutions to Chapter 29 Exercises

- 1. The Earth intercepts such a tiny fraction of the expanding spherical wave from the Sun that it can be approximated as a plane wave (just as a small portion of the spherical surface of the Earth can be approximated as flat). The spherical waves from a nearby lamp have noticeable curvature. (See Figures 29.3 and 29.4.)
- 7. The alternation of sound from loud to soft is evidence of interference. Where the sound is loud, the waves from each loudspeaker are interfering constructively; where it is soft, destructive interference from the speakers is taking place.
- 13. Larger wavelengths diffract more (since the ratio of wavelength to slit size is greater), so red diffracts the most and blue the least.
- 16. The spot will be bright due to constructive interference.
- 19. Destructive interference.
- 23. Fringes become closer together as the slits are moved farther apart. (Note this in the photos of Figure 29.15.)
- 26 Diffraction is the principle by which peacocks and hummingbirds display their colors. The ridges in the surface layers of the feathers act as diffraction gratings.