

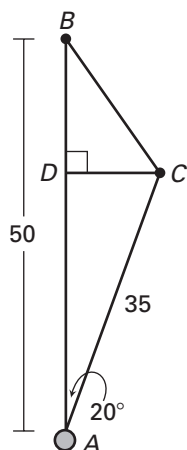
## Real-Life Application: When Will I Ever Use This?

For use with pages 567–572

### Hubble Space Telescope

The Hubble Space Telescope (HST) is a telescope in orbit around Earth. Being above the atmosphere allows it to receive images and signals from the stars and planets without distortion. The HST was set up on April 25, 1990 from the space shuttle Discovery. Since then it has captured stunning images of planets and stars. It has discovered galaxies as far away as 7 billion light years. A light year is the distance light travels in a year.

One of the uses of the HST is to help scientists with Astrometry, which is the science of measuring the distance of stars and planets from Earth and each other. The HST is a radio telescope that gives accurate measurements of star distances from Earth but trigonometry must be used to calculate the distance from star to star. The illustration below shows stars  $B$  and  $C$  and their relative position to Earth located at point  $A$ . The stars are 20 degrees apart in the sky and the HST has discovered that star  $B$  is 50 units from Earth and star  $C$  is 35 units from Earth. One unit is 10,000 light years.



In Exercises 1–5, use the diagram above.

1. Use a trigonometric ratio to find  $CD$ . Round to the nearest tenth.
2. Use a trigonometric ratio to find  $AD$ . Round to the nearest tenth.
3. Find  $BD$  to the nearest tenth.
4. What method can you use to find  $BC$  knowing  $CD$  and  $BD$ ?
5. Find  $BC$  in light years.