



28.1 Parsecs

READ


You have already learned about two units of measurement commonly used in astronomy:

- The astronomical unit (AU), which is the average distance between Earth and the Sun: 1.46×10^8 km
- The light year (ly), which is the distance light travels through space in one year: 9.468×10^{12} km

Chapter 28 of your text introduces a third unit of distance, the parsec (pc). The word *parsec* stands for “parallax of one arcsecond” which refers to the geometric method used by astronomers to figure out distances between objects in space. For our purposes, we will define the parsec as equal to 3.26 light years, or 206,265 astronomical units. This means that you would have to make 206,265 trips from Earth to the Sun (or 103,132.5 round trips) in order to travel 1 parsec!

1 parsec = 3.26 light years or 206,265 astronomical units

In this skill sheet, you will practice converting between parsecs, light years, astronomical units, and kilometers.

EXAMPLES


1. Converting light years (ly) to parsecs (pc)

Earth’s closest star (Proxima Centauri) is about 4.22 light years away. How far is this in parsecs?

Explanation/Answer: Divide the number of light years given (in this case, 4.22 ly) by the number of light years in one parsec (3.26 ly).

$$4.22 \text{ ly} \div \frac{3.26 \text{ ly}}{1 \text{ pc}} = 4.22 \text{ ly} \times \frac{1 \text{ pc}}{3.26 \text{ ly}} = 1.29 \text{ pc}$$

2. Converting astronomical units (AU) to parsecs (pc)

Polaris (the North Star) is about 2.789×10^7 astronomical units from Earth. How far is this in parsecs?

Explanation/Answer: Divide the number of astronomical units (in this case, 2.789×10^7 AU) by the number of astronomical units in one parsec (206,265 AU).

$$2.789 \times 10^7 \text{ AU} \div \frac{206,265 \text{ AU}}{1 \text{ pc}} = 2.789 \times 10^7 \text{ AU} \times \frac{1 \text{ pc}}{2.06265 \times 10^5 \text{ AU}} = 1.352 \times 10^2 \text{ or } 135.2 \text{ pc}$$



PRACTICE



Convert each number of light years to parsecs.

1. 6.00 light years
2. 4.50×10^6 light years
3. 4.00×10^{-3} light years

Convert each number of astronomical units to parsecs.

4. 5.25×10^6 AU
5. 100. AU
6. 11,300,000 AU

Solve each problem using what you have learned.

7. The Milky Way galaxy is about 100,000 light years across. How large is this in parsecs?
8. The Andromeda galaxy is approximately 2,500,000 light years from Earth. How far is this in parsecs?
9. Regulus (one of the stars in the constellation Leo the Lion) is about 85 light years from Earth. How far is this in parsecs?
10. The average distance from the Sun to Pluto is approximately 29.6 astronomical units. How far is this in parsecs?