**Answer Key**

**Pi in the Sky 7: Planet Pinpointer**

Our galaxy contains billions of stars, most of which are likely home to exoplanets – planets outside our solar system. How do scientists decide where to look for these worlds? Researchers looking at data from NASA's Spitzer Space Telescope found that giant exoplanets tend to exist around young stars surrounded by a disk of debris.

A prominent debris disk around the star Beta Pictoris, which is 5.99864 x 1014 km away from Earth, lead scientists to discover two exoplanets several times bigger than Jupiter orbiting the star! Learning more about Beta Pictoris’ debris disk could give scientists insight into the formation of these giant worlds. Given the angle of the disk's apparent size is 169 arcseconds, determine the actual distance across it using the formula for small angle approximation, below. (An arcsecond is 1/3,600 of a degree.)

**D=dθ**

**D** = distance across the debris disk (in km)

**d** = distance to Beta Pictoris (in km)

**Θ** = angle of apparent size (in radians)

**Solution**

1. Convert arcseconds to degrees.

1 arcsec = (1/3,600)°

169 arcsec \* 1° / 3,600 arcsec ≈ 0.0469°

1. Multiply degrees π/180° to convert degrees to radians

0.0469° \* (π / 180°) ≈ 0.000819 radians

1. Use the formula for small angle approximation to find the distance across the Beta Pictoris debris disk.

D = dθ

D = (6\*10^14) \* 0.000819 ≈ **500 billion km**