Extra Example 2 Using a Great Circle

The circumference of a great circle of a sphere is $24.6\pi$ inches. What is the surface area of the sphere?

**Solution**

Begin by finding the radius of the sphere.

\[
C = 2\pi r \quad \text{Formula for circumference of a circle}
\]

\[
24.6\pi = 2\pi r \quad \text{Substitute } 24.6\pi \text{ for } C.
\]

\[
12.3 = r \quad \text{Divide each side by } 2\pi.
\]

Using a radius of 12.3 inches, the surface area is

\[
S = 4\pi r^2 = 4\pi(12.3)^2 = 605.16\pi \text{ in.}^2
\]

So, the surface area of the sphere is $605.16\pi$, or about 1901 square inches.