12.1, number 43: **Describe the following circle using either one equation or two equations. The circle is the set of points which are on the plane through the point $(1, 1, 3)$ perpendicular to the z-axis and also are on the sphere of radius 5 centered at the origin.**

Answer: The first condition "the set of points which are on the plane through the point $(1, 1, 3)$ perpendicular to the z-axis" is a clumsy way of saying $z = 3$. So we want the circle that satisfies the two equations

$$\boxed{z = 3 \text{ and } x^2 + y^2 + z^2 = 25}$$

Of course,

$$\boxed{z = 3 \text{ and } x^2 + y^2 = 16}$$

is also a fine answer.

But notice that you have to have two equations! The equation $x^2 + y^2 = 16$ all by it self represents a cylinder in 3-space.