Find an equation of the sphere that passes through the point $(4, 3, -1)$ and has center $(3, 8, 1)$.

**Solution:** The distance between the given points is the radius of the sphere:

$$r = \sqrt{(4 - 3)^2 + (3 - 8)^2 + (-1 - 1)^2} = \sqrt{30}.$$ 

Therefore, the equation is

$$(x - 3)^2 + (y - 8)^2 + (z - 1)^2 = 30.$$