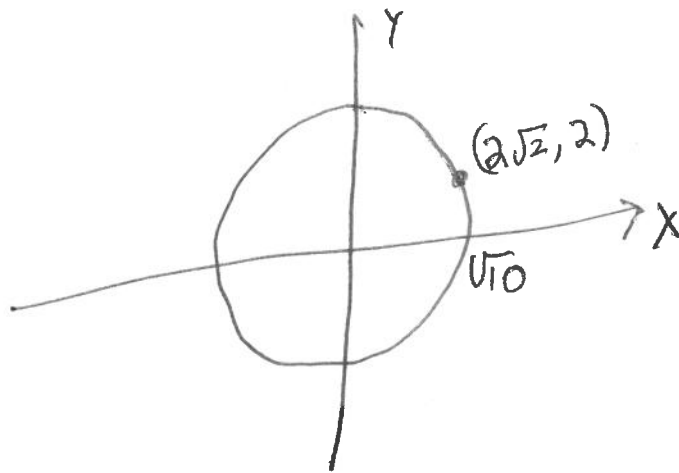14.1, number 49: **Sketch the level set for** $f(x, y) = 16 - x^2 - y^2$ **which passes through** $(2\sqrt{2}, \sqrt{2})$. **What is the equation of this level set?**

**Answer:** Observe that $f(2\sqrt{2}, \sqrt{2}) = 16 - 8 - 2 = 6$. So the level set of $f$ that passes through $(2\sqrt{2}, \sqrt{2})$ is $6 = 16 - x^2 - y^2$, which is the same as $x^2 + y^2 = 10$.

There is a picture on the next page.

$(2\sqrt{2},2)$

$\sqrt{10}$

The level set of $f(x,y) = \sqrt{16-x^2-y^2}$

which contains $(2\sqrt{2},2)$