§14.1: p. 958: # 42. Find an equation for the level surface at the given point.

\[ f(x, y, z) = \ln \left( x^2 + y + z^2 \right), \quad P(-1, 2, 1). \]

**Solution:**

1. \[ f(P) = \ln \left( (-1)^2 + 2 + (1)^2 \right) = \ln \left( 1 + 2 + 1 \right) = \ln(4). \]

2. So, considering \( w = f(x, y, z) \), we have \( w = \ln(x^2 + y + z^2) \) and at \( P \), \( w = \ln(4) \); therefore

\[ \ln(x^2 + y + z^2) = 4 \]  
(This is a solution to the problem, but a "better" solution is...)

\[ x^2 + y + z^2 = e^4 \]  
(The graph of which is a paraboloid "opening to the left" with vertex at \((0, 0, 0)\).)

§14.1: p. 958: # 29. Find an equation for the level curve at the given point.

\[ f(x, y) = 16 - x^2 - y^2, \quad P(2\sqrt{2}, \sqrt{2}). \]

**Solution:**

1. \[ f(P) = 16 - 8 - 2 = 6 \]

2. \[ \therefore \quad \text{Eq. for level curve is } \ g = 16 - x^2 - y^2, \text{ or} \]

\[ x^2 + y^2 = 10 \]