

Let $g(x, y) = x^2 - 4x + y^2 - 8y + xy + 20$.

1. Find g_x and g_y .
2. Evaluate $g_x(1, 3)$ and $g_y(1, 3)$.
3. Create a 3-D plot of $z = g(x, y)$ near $(1, 3)$.
Do your answers from #2 make sense?
4. At what point (x_0, y_0) does $z = g(x, y)$ obtain its minimum value?
Verify your answer using a contour plot of $g(x, y)$.