Class Worksheet 2/22/2022

Example 1: The temperature $H(x, t)$, in °C, in a room is a function of distance x, in meters, from a heater and time t, in minutes, after the heater has been turned on.

(a) What are the units of $H_x(x, t)$ and $H_t(x, t)$? What are the signs of the partial derivatives?

(b) Assume that $H(10, 20) = 19$ and $H_x(10, 20) = -0.5$. Estimate $H(11.5, 20)$. Give units with your answer.

Example 2:

(a) Find the equation of the tangent plane to the graph of $z = f(x, y) = x^2 + y^2$ at the point $(a, b) = (3, 4)$.

(b) Estimate $f(2.9, 4.2)$ using the local linearization at $(a, b) = (3, 4)$. Compare your estimate to the actual value $f(2.9, 4.2)$.