

Name _____

Homework 11
Sections 14.4 & 14.5

1. (5) Consider the function $f(x, y)$. If you start at the point $(4, 5)$ and move toward the point $(7, 9)$, the directional derivative is 11. If you start at the point $(4, 5)$ and move toward the point $(8, 8)$, the directional derivative is 10. Find ∇f at $(4, 5)$

2. (5,4,1) The temperature, T , at a point (x, y, z) on a certain surface is given by
 $T = 4x^2 - y^2 + 16z^2$.

(a) Find the rate of change of T at the point $(4, -2, 1)$ in the direction of $2\vec{i} + 6\vec{j} - 3\vec{k}$.

(b) In what direction does T increase most rapidly at the point $(4, -2, 1)$?

(c) What is the maximum rate of change?

3. (2,3) At what point(s) on the surface $z = 3 + x^2 + y^2$ is its tangent plane parallel to the following planes?

(a) $z = 2$

(b) $z = 8x - 6y + 7$