14.2: More Partial Derivatives

Calculus III

College of the Atlantic. Winter 2016

1. The quantity Q of tofu, in pounds per week, purchased at a store is a function $Q(t, s)$ of the price per pound t of tofu and the price per pound s of seitan.

   (a) What is the meaning of $Q(2, 3) = 65$?

   (b) What is the sign of Q_t?

   (c) What is the sign of Q_s?

   (d) What is the meaning of $Q_s(2, 3) = 18$?

2. Consider the following functions:

   - $f(x, y) = x^2 + y^2$
   - $g(x, y) = 4x^5y^6$
   - $h(x, y) = \sin(x^2y^3)$

   Find the following derivatives

   (a) f_x

   (b) f_y

   (c) f_{xx}

   (d) f_{yy}

   (e) g_x

   (f) h_y

3. Geometrically, what does f_{xx} tell you?

4. Suppose that $f(2) = 3$ and $f'(2) = -0.4$.

   (a) Estimate $f(2.4)$.

   (b) Write down the tangent line approximation of $f(x)$ at $x = 2$.

5. Let $g(x) = x^2$ Write down the tangent line approximation to $g(x)$ at $x = 2$.