

Homework Section 14.3

1. Find the first partial derivatives of the given function.
 - a) $f(x, y) = 4x^2 - y^4$
 - b) $z = xe^{5y}$
 - c) $g(x, y) = 3x^y$
 - d) $f(m, n) = m \ln(m + n^2)$
 - e) $f(x, y, z) = xy^2z^3 + 2yz$

2. Find the first partial derivative of the given function and evaluate it as indicated:
 - a) $f(x, y) = \sqrt{x^2 + y^2}$; $f_x(5, 12)$
 - b) $f(x, y) = \cos(x - 2y)$; $f_y(\pi, \pi/4)$
 - c) $f(x, y, z) = \frac{2x}{y + z}$; $f_z(1, 3, 2)$

3. Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ using implicit differentiation: $\sin(xyz) = x + 3y + 2z$.

4. Find the four second partials of $f(x, y) = x^3y^2 - 2xy^4$.

5. Find the indicated partial derivative(s) of the given function:
 - a) $f(x, y) = 2xy^4 + x^3y^2$; f_{yxx}
 - b) $w = \frac{x}{2y + z}$; $\frac{\partial^3 w}{\partial x^2 \partial y}$ and $\frac{\partial^3 w}{\partial z \partial y \partial x}$

6. Let blood alcohol percentage values, $f(w, d)$, be given in the body of the following chart, where w stands for body weight in pounds and d stands for drinks consumed in less than 1 hour.

		Number of Drinks						
Body Weight		1	2	3	4	5	6	7
120 lb.		0.031	0.063	0.094	0.125	0.156	0.188	0.219
130 lb.		0.029	0.058	0.087	0.116	0.145	0.174	0.203
140 lb.		0.027	0.054	0.08	0.107	0.134	0.161	0.188
150 lb.		0.025	0.05	0.075	0.1	0.125	0.151	0.176

- a) Estimate $f_d(140, 3)$ using the table.
- b) What are the units of $f_d(140, 3)$?
- c) Interpret the meaning of your estimate for $f_d(140, 3)$.