

Math 118 – Week 6 Assignments
Fall Term 2003
BUCKMIRE

Monday September 29 *Class 13:*

With the notion of partial derivatives we will construct the full microscope equation and discuss finding maxima and minima for functions of two variables.

Homework #9 (5 points):

1. Find the partial derivatives of the following functions
 - (a) x^2y
 - (b) $\sqrt{x+y}$
 - (c) 10^{xy}
 - (d) $\sin(y/x)$
 - (e) $2\sqrt{x}\sqrt[3]{y} - 7\cos(x)$
2. Suppose $z = f(x, y)$, $f(3, 12) = 240$, $f_x(3, 12) = 7$ and $f_y(3, 12) = 4$.
 - (a) Estimate $f(4, 12)$, $f(3, 13)$, $f(4, 13)$ and $f(4, 10)$
 - (b) When $x = 3$ and $y = 12$, how much does a 1% increase in x cause z to change? How much does a 1% increase in y cause z to change? Which has a larger effect?

Due: Class 14

Wednesday October 1 *Class 14:*

We will continue our multivariable section by learning how to determine whether a critical point is a local max, local min or saddle point.

Homework #10 (4 points):

1. Find the equation for the plane tangent to the surface graph of $f(x, y) = (x^2 + y^2)((x - 1)^2 - y^2) + 3$ at the point $(x_0, y_0, z_0) = (1, 1, f(1, 1))$.
2. Determine whether the following statements are TRUE or FALSE. Provide work which supports your view.
 - (a) $z = f(x, y) = x^2 - 2xy + y^2$ has a saddle point at $(0, 0, 0)$. TRUE or FALSE?
 - (b) $z = f(x, y) = x^2 - 3xy + y^2$ has an absolute minimum at $(0, 0, 0)$. TRUE or FALSE?

Due: Class 15

Thursday September 11 Lab #4: Visualizing Functions of Two Variables

Since functions of two variables are challenging to draw, we will get the computer to construct contour plots so that we can visualize surfaces determined by a functions of two variables, $z = f(x, y)$.

Friday October 3 *Class 15:*

We will discuss how to optimize a function of two variables while under a constraint and summarize optimization of a multivariable function $f(x, y)$

Homework:

Quiz #5: Multivariable Optimization

Due: Class 16