Learning Enhancement Team

University of East Anglia
STUDENT SUPPORT SERVICE

Worksheet: Basics of Partial Differentiation

This worksheet has questions on the differentiation of a function with two variables. Before attempting the questions below, you could read the study guide: *Basics of Partial Differentiation*.

Basics of Partial Differentiation Study Guide

Model Answers to this sheet

1. Look at the equations below and find their first partial derivatives. Be careful to use the correct notation in your answers:

   the first partial derivative with respect to x is written as $\frac{\partial z}{\partial x}$.

   the first partial derivative with respect to y as $\frac{\partial z}{\partial y}$.

a. $z = -2x^{-2}$ b. $z = 4e^{y}$

What do you notice about your answers?

2. Find the first partial derivatives of the following functions:

a. $z = x^2 + 2x + y^3 - 2y + 6$ b. $z = 3x^3 - 2y^3 + x^{-2} - \frac{y^{-2}}{4} + 2016$

c. $z = xy^2$ d. $z = \frac{x + y}{x^2 + 2y}$

e. $z = xe^{y} + y^2\cos(x) + y\ln(x)$ f. $z = xe^{x+y} - ye^{x-y}$

3. Find the second order partial derivatives of the functions given in question 2.

This worksheet is one of a series on mathematics produced by the Learning Enhancement Team with funding from the UEA Alumni Fund. Scan the QR-code with a smartphone app to go to our website.

CC BY NC SA

University of East Anglia
STUDENT SUPPORT SERVICE