

# Learning Enhancement Team

## Worksheet: Implicit Differentiation

This worksheet has questions on implicit differentiation. Before attempting the questions below, you could read the study guide: [Implicit Differentiation](#).

Implicit  
Differentiation  
study guide



Model Answers  
to this sheet



1. Look at the implicit functions below which contain two variables, remember that you assume that  $y$  is a function of  $x$ . Differentiate them with respect to  $x$ .

a.  $x^2 + y^2 + y = 0$

b.  $x^4 + y^4 - 4 = 0$

c.  $x^3y^4 + x^4y^3 - y = 0$

d.  $-x^2 + 7xy + 6y^3 - 6 = 0$

e.  $\frac{x^2 - y^3}{y + x} - x + y - 2 = 0$

f.  $\frac{x^4 + 3y^3}{2y^4 + x} - x^2y + y^{-4} - 2 = 0$

2. Differentiate the following implicit functions with respect to  $x$ .

a.  $-xy + e^y = 0$

b.  $-x(y^2 + xe^y + \cos x) = 0$

c.  $e^{xy} + e^{6y} - e^{2x} = 0$

d.  $\ln(xy) + \sin(2x - y) = 0$

e.  $\cos(x + 2y) - \cos x - \cos^2 y = 0$



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 for [more resources](#).

