

IMPLICIT EQUATIONS

A2 Unit 3: Pure Mathematics B

WJEC past paper questions: 2008 – 2017

Total marks available 49 (approximately 1 hour)

1. Find the equation of the normal to the curve

$$x^2 + xy + 2y^2 = 8$$

at the point $(-3, 1)$.

[5]

(Summer 08)

- 2.

Find the equation of the normal to the curve

$$5x^2 + 4xy - y^3 = 5$$

at the point $(1, -2)$.

[5]

(Summer 10)

- 3.

Find the equation of the normal to the curve

$$x^4 - 2x^2y + y^2 = 4$$

at the point $(1, 3)$.

[5]

(Summer 11)

4. Find the equation of the tangent to the curve

$$y^3 - 4x^2 - 3xy + 25 = 0$$

at the point $(2, -3)$.

[4]

(Summer 12)

5. Find the equation of the normal to the curve

$$x^3 - 2xy^2 + y^3 = 5$$

at the point (2, 1).

[5]

(Summer 13)

6. The curve C is defined by

$$3x^3 - 5xy^2 + 2y^4 = 15.$$

The point P has coordinates (1, 2) and lies on C .
Find the equation of the **normal** to C at P .

[5]

(Summer 14)

7. The curve C has equation

$$x^4 + 3x^2y - 2y^2 = 34.$$

(a) Show that $\frac{dy}{dx} = \frac{4x^3 + 6xy}{4y - 3x^2}$. [3]

(b) Find the coordinates of each of the points on C where the tangent is parallel to the y -axis. [4]

(Summer 15)

8. The curve C has equation

$$x^4 + 2x^3y - 3y^4 = 16.$$

(a) Show that $\frac{dy}{dx} = \frac{2x^3 + 3x^2y}{6y^3 - x^3}$. [3]

(b) Show that there are only two points on C where the gradient of the tangent is -2 .
Find the coordinates of each of these two points. [4]

(Summer 16)

9. The curve C has equation

$$y^6 - 3x^4 - 9x^2y + 48 = 0.$$

(a) Show that $\frac{dy}{dx} = \frac{6xy + 4x^3}{2y^5 - 3x^2}$. [3]

(b) Find the gradient of the tangent to C at each of the points where C crosses the x -axis. [3]

(Summer 17)