



QUESTION WORKBOOK

Implicit and parametric differentiation

Differentiation · Year 12–13

8 questions · 33 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Differentiate y^3 with respect to x , and then differentiate the product xy with respect to x . [2]

- A2** A curve has equation $y^2 = 4x$. Find dy/dx in terms of y , and hence find the gradient of the curve at the point $(4, 4)$. [2]

SECTION B · Standard

- B1** Find the gradient of the circle $x^2 + y^2 = 100$ at the point $(6, 8)$. [4]

- B2** The curve C has equation $2x^2 + 3y^2 - xy = 16$. Find dy/dx in terms of x and y , and hence find the gradient of C at the point $(2, 2)$. [5]

- B3** A curve has parametric equations $x = t^2$, $y = t^3$. Find dy/dx in terms of t , and find the coordinates and the gradient of the point on the curve where $t = 2$. [4]

SECTION C · Stretch

- C1** The curve C has equation $x^2 + xy + y^2 = 12$. Find the coordinates of the two points on C at which the tangent is parallel to the x -axis. [6]

- C2** A curve has parametric equations $x = 3 \cos t$, $y = 2 \sin t$, $0 \leq t < 2\pi$. Find an equation of the tangent to the curve at the point where $t = \pi/3$, giving your answer in the form $ax + by = c$ with a , b and c exact. [6]

- C3** Given that $x = \sin y$, where $-\pi/2 \leq y \leq \pi/2$, show that $dy/dx = 1/\sqrt{1-x^2}$. [4]