



Finding the Equation of a Curve Given the Differential (From OCR 4722)

Q1, (Jan 2007, Q3)

(i) Find  $\int (4x - 5) dx$ . [2]

(ii) The gradient of a curve is given by  $\frac{dy}{dx} = 4x - 5$ . The curve passes through the point (3, 7). Find the equation of the curve. [3]

---

Q2, (Jan 2008, Q5)

The gradient of a curve is given by  $\frac{dy}{dx} = 12\sqrt{x}$ . The curve passes through the point (4, 50). Find the equation of the curve. [6]

---

Q3, (Jun 2011, Q2)

(i) Find  $\int (6x^{\frac{1}{2}} - 1) dx$ . [3]

(ii) Hence find the equation of the curve for which  $\frac{dy}{dx} = 6x^{\frac{1}{2}} - 1$  and which passes through the point (4, 17). [3]

---

Q4, (Jun 2012, Q2)

(i) Find  $\int (x^2 - 2x + 5) dx$ . [3]

(ii) Hence find the equation of the curve for which  $\frac{dy}{dx} = x^2 - 2x + 5$  and which passes through the point (3, 11). [3]

---

Q5, (Jun 2015, Q5)

A curve has an equation which satisfies  $\frac{d^2y}{dx^2} = 3x^{-\frac{1}{2}}$  for all positive values of  $x$ . The point  $P(4, 1)$  lies on the curve, and the gradient of the curve at  $P$  is 5. Find the equation of the curve. [7]

---

Q6, (Jun 2018, Q8)

A curve passes through the point (1, 8) and has an equation which satisfies  $\frac{dy}{dx} = 2x + \frac{a}{x^3} + 3$  for all non-zero values of  $x$ . The area enclosed by the curve, the  $x$ -axis, the line  $x = 1$  and the line  $x = 3$  is 30 square units. Find the value of the positive constant  $a$ . [9]

---