

# Applications of Differentiation

## Question Paper 8

Level	A Level
Subject	Maths
Exam Board	OCR
Topic	Differentiation
Sub Topic	Applications of Differentiation
Booklet	Question Paper 8

**Time Allowed:** 11 minutes

**Score:** /9

**Percentage:** /100

1 (i) Find the gradient of the curve  $y = 2x^2$  at the point where  $x = 3$ . [2]

(ii) At a point  $A$  on the curve  $y = 2x^2$ , the gradient of the normal is  $\frac{1}{8}$ . Find the coordinates of  $A$ . [3]

Points  $P_1(1, y_1)$ ,  $P_2(1.01, y_2)$  and  $P_3(1.1, y_3)$  lie on the curve  $y = kx^2$ . The gradient of the chord  $P_1P_3$  is 6.3 and the gradient of the chord  $P_1P_2$  is 6.03.

(iii) What do these results suggest about the gradient of the tangent to the curve  $y = kx^2$  at  $P_1$ ? [1]

(iv) Deduce the value of  $k$ . [3]

2 The points  $A(1, 3)$  and  $B(4, 21)$  lie on the curve  $y = x^2 + x + 1$ .

(i) Find the gradient of the line  $AB$ . [2]

(ii) Find the gradient of the curve  $y = x^2 + x + 1$  at the point where  $x = 3$ . [2]