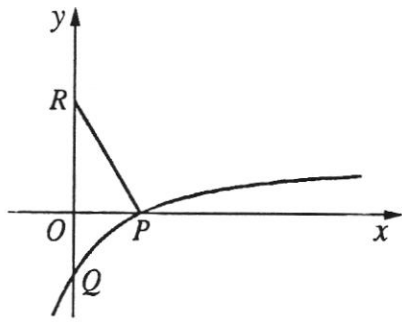


PAST YEARS EXAMINATION QUESTIONS

1



The diagram shows part of the curve $y = \frac{2x-6}{x+2}$ crossing the x -axis at P and the y -axis at Q . The normal to the curve at P meets the y -axis at R .

(i) Given that $\frac{dy}{dx} = \frac{k}{(x+2)^2}$, evaluate k . [3]

(ii) Find the length of RQ . [6]

N2002/I/11

2 The normal to the curve $y = \frac{3}{x^2-6}$ at the point $(3, 1)$ crosses the x -axis at the point P . Find the coordinates of P .

N2002/I/12(b) (AO Maths)

3 Differentiate $\sqrt{1+6x}$ with respect to x .

N2003/I/1 (AO Maths)

4 Find the equation of the normal to the curve $y = 6x - \frac{16}{x^2}$ at the point $(2, 0)$.

N2003/I/16(b) (AO Maths)

5 Given that $y = \frac{3+x}{\sqrt{2+x}}$, find the value of $\frac{dy}{dx}$ when $x = 2$.

N2004/I/9(i) (AO Maths)

6 A curve has the equation $y = 2x^2 + \frac{6}{x}$. Find the equation of

(i) the tangent to the curve at the point $P(1, 8)$,

(ii) the normal to the curve at the point $P(1, 8)$.

The tangent to the curve at P meets the x -axis at T . The normal to the curve at P meets the y -axis at N .

(iii) Find the perimeter of the triangle PTN .

N2005/I/16 (Or) (AO Maths)

7 A curve has the equation $y = \frac{x+6}{2x-3}$, where $x \neq \frac{3}{2}$.

(i) Show that the gradient of the curve can be expressed as $\frac{k}{(2x-3)^2}$, where k is a constant.

(ii) Find the value of x for which $\frac{d^2y}{dx^2} = \frac{12}{25}$.

N2005/II/6 (AO Maths)

8 The equation of a curve is $y = \frac{8}{(3x-4)^2}$.

Find the gradient of the curve where $x = 2$. [3]

N2006/I/3(i)

9 A curve has the equation $y = \frac{2x-4}{x+3}$.

(i) Obtain an expression for $\frac{dy}{dx}$ and hence explain why the curve has no turning points.

The curve intersects the x -axis at the point P . The tangent to the curve at P meets the y -axis at the point Q .

(ii) Find the area of the triangle POQ , where O is the origin. [5]

N2006/I/9

10 A curve has equation $y = x^3 + ax + b$, where a and b are constants. The gradient of the curve at the point $(2, 7)$ is 3. Find

(i) the value of a and of b , [5]

(ii) the coordinates of the other point on the curve where the gradient is 3. [2]

N2006/II/6

11 Differentiate $(3x+2)^{11}$ with respect to x .

N2007/I/9(i) (AO Maths)

12 A curve is such that $\frac{dy}{dx} = \frac{6}{(2x-1)^2}$ and $P(2, 9)$ is a point on the curve. The normal to the curve at P meets the y -axis at Q and the x -axis at R .

(i) Find the coordinates of the mid-point of QR . [5]

(ii) Find the equation of the curve. [4]

A point (x, y) moves along the curve in such a way that the x -coordinate increases at a constant rate of 0.03 units per second.

(iii) Find the rate of change of the y -coordinate as the point passes through P . [2]

N2008/II/10