

Past Examination Questions
Tangents and Normals

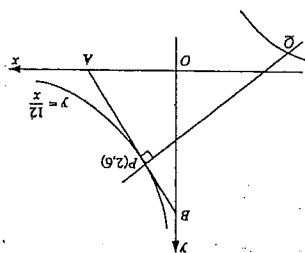
Part 7

- Find the gradient of the curve $y = 4x^2 - 20x + 27$ at the point $P(2, 3)$. The tangent to the curve at P meets the x -axis at A . Calculate the area of the triangle AOP , where O is the origin. (J2000/P1/1)

- The equation of a curve is $y = \frac{10}{1+x^2}$. Find the equation of the normal to the curve at the point where $x = 3$. (N2000/P1/8)

- Find the equation of the tangent to the curve $xy + x^2 = 2y$ at the point on the curve where $x = 1$. (N2000/P2/8a)

- The diagram shows part of the curve $y = \frac{x}{12}$ and the tangent to the curve at the point $P(2, 6)$ which meets the x -axis at A and the y -axis at B .



- Show that P is the mid-point of AB .
- The diagram also shows the normal to the curve at P which meets the curve again at Q .

(ii) Find the coordinates of Q . (sp1/12OR)

- Show that the tangent to the curve $y = \frac{x}{3} - \frac{x^2}{4}$ at the point $(2, \frac{1}{2})$ passes through the origin. (J01/P1/4)

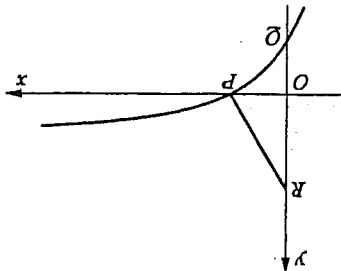
- The point P lies on the curve $y = x^2 - 3x + c$, where c is a constant. The equation of the tangent to the curve at P is $y = 5x + 3$. Find the equation of the normal to the curve at P . (N01/P1/10)

- Find the equation of the normal to the curve $y = \frac{x-1}{2x+4}$ at the point where the curve meets the x -axis. (N01/P2/3b)

- 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 .

- (ii) Find the length of RQ . (N2002/P1/11)



1. $-4; 4\frac{1}{8}$ units²
2. $3y - 5x + 12 = 0$
3. $y = 3x - 2$
4. (i) $(-18, -\frac{3}{2})$
5. $5y = 119 - x$
6. $2y = 3(x + 2)$
7. (i) $k = 10$
8. (b) 10.5 units