10.

<https://fineview.academy>

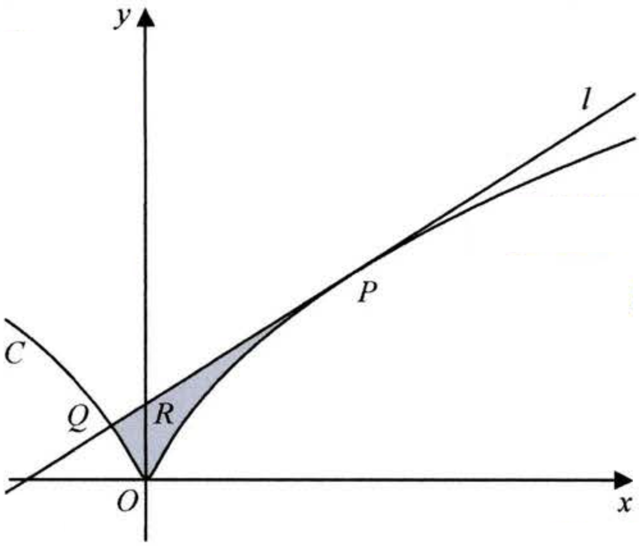

Figure 2

The curve C shown in Figure 2 has parametric equations

$$x = t^3 + 3t \qquad y = 3t^2 \qquad -2 < t < 4$$

The point P lies on C where $t = 3$

(a) Write down the coordinates of P

(1)

The line l is the tangent to C at P as shown in Figure 2.

(b) Use calculus to show that an equation for l is

$$3x - 5y + 27 = 0$$

(3)

The line l meets C again at the point Q

(c) Using algebra and showing all stages of your working, find the coordinates of Q

(3)

The finite region R, shown shaded in Figure 2, is bounded by the curve C and the line l

(d) Using algebraic integration, find the exact area of R

(5)