8

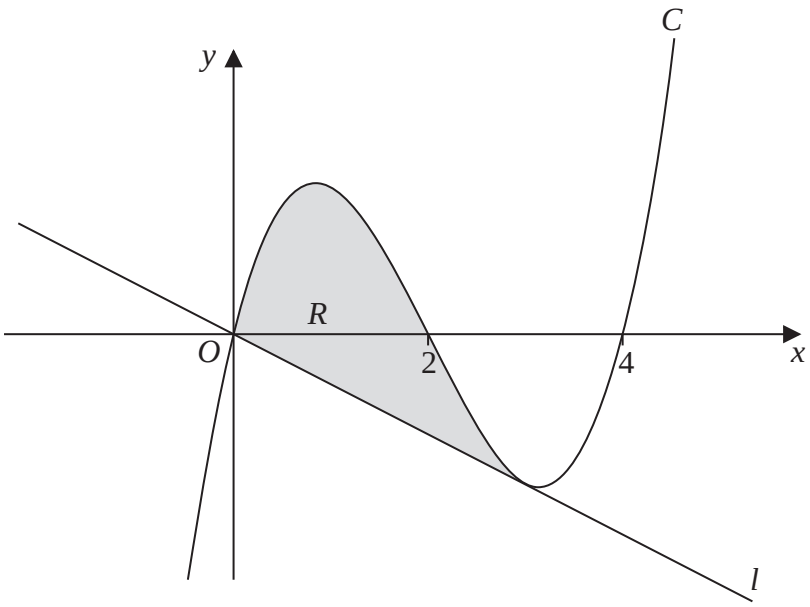

Diagram **NOT** accurately drawn

Figure 3

Figure 3 shows part of the curve C with equation $y = x^3 + ax^2 + bx + c$

The curve passes through the origin O and the points with coordinates (2, 0) and (4, 0).

(a) Show that $c = 0$

(1)

(b) Find the value of a and the value of b.

(3)

The point P with x-coordinate 3 lies on C. The line l passes through O and meets C at P.

(c) Show that l is the tangent to C at P.

(4)

The finite region R, shown shaded in Figure 3, is bounded by C and by l.

(d) Use algebraic integration to find the area of R.

(5)

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 13 marks)