

14. A curve C has equation $y = f(x)$ where

$$f(x) = -3x^2 + 12x + 8$$

(a) Write $f(x)$ in the form

$$a(x + b)^2 + c$$

where a , b and c are constants to be found.

(3)

The curve C has a maximum turning point at M .

(b) Find the coordinates of M .

(2)

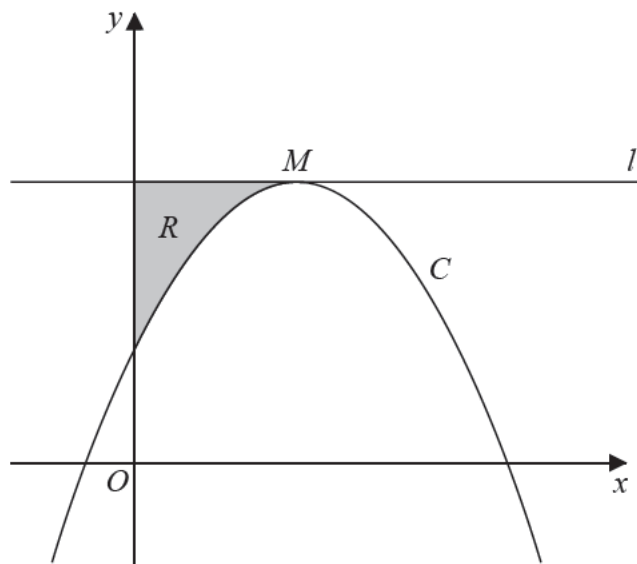


Figure 3

Figure 3 shows a sketch of the curve C .

The line l passes through M and is parallel to the x -axis.

The region R , shown shaded in Figure 3, is bounded by C , l and the y -axis.

(c) Using algebraic integration, find the area of R .

(5)