5.

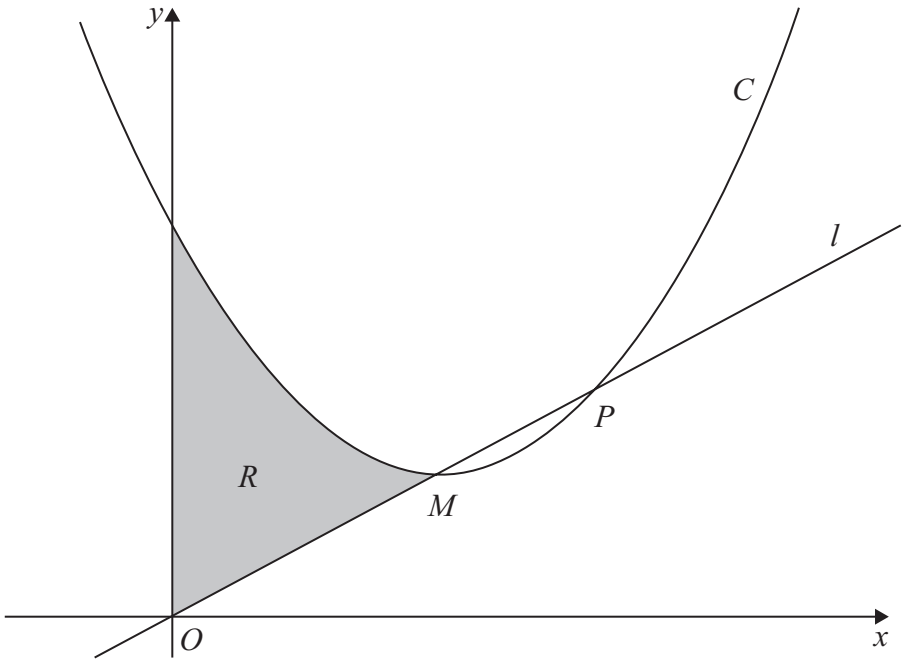

Figure 1

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

(a) Express $2x^2 - 16x + 50$ in the form

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

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

(3)

Figure 1 shows a sketch of the curve C with equation $y = 2x^2 - 16x + 50$

Given that in Figure 1

- M is the minimum point on C
- line l passes through the origin and intersects C at the points M and P

(b) find, using algebra and showing your working, the x coordinate of P.

(5)

The region R is shown shaded in Figure 1.

(c) Use inequalities to fully define R.

(2)

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Question 5 continued

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Question 5 continued

(Total for Question 5 is 10 marks)

6. (a) Sketch the graph of the curve C with equation

$$y = \frac{4k}{x - 2k}$$

where k is a positive constant.

On your sketch show

- the coordinates of any points where C cuts the coordinate axes
- the equation of the vertical asymptote to C

(4)

The straight line l has equation

$$y = 6 - 2x$$

Given that there is at least one point of intersection between l and C,

(b) find the range of possible values of k.

(5)

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