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

(i) Using the laws of indices, solve

$$3^{2p-5} = \frac{1}{9}\sqrt{27}$$

(3)

(ii) Find the real roots of the equation

$$x^2 + 1 = \frac{36}{x^2 - 4}$$

(4)

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Question 4 continued

Question 4 continued

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Question 4 continued

(Total for Question 4 is 7 marks)

5.

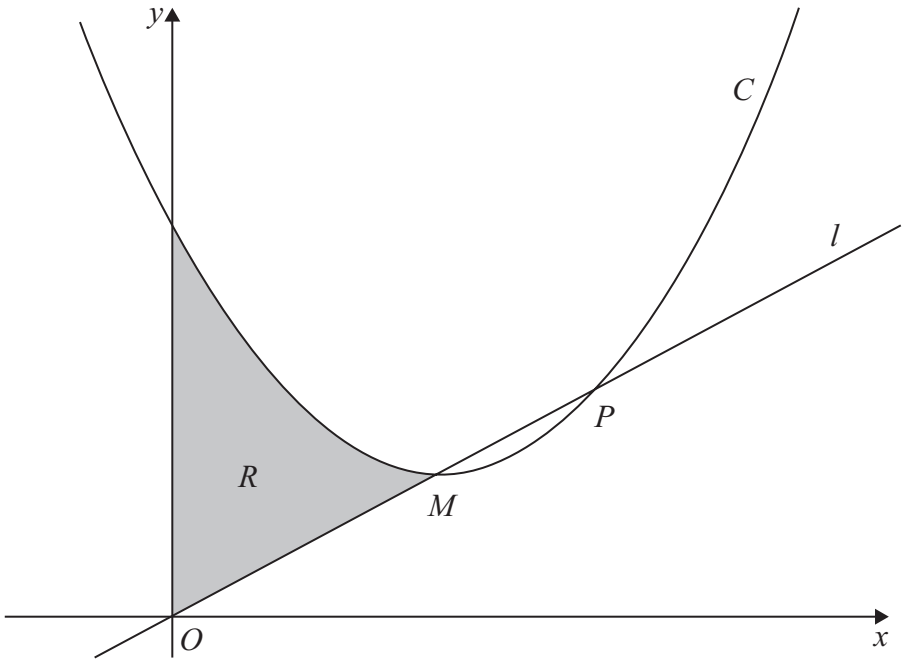

Figure 1

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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