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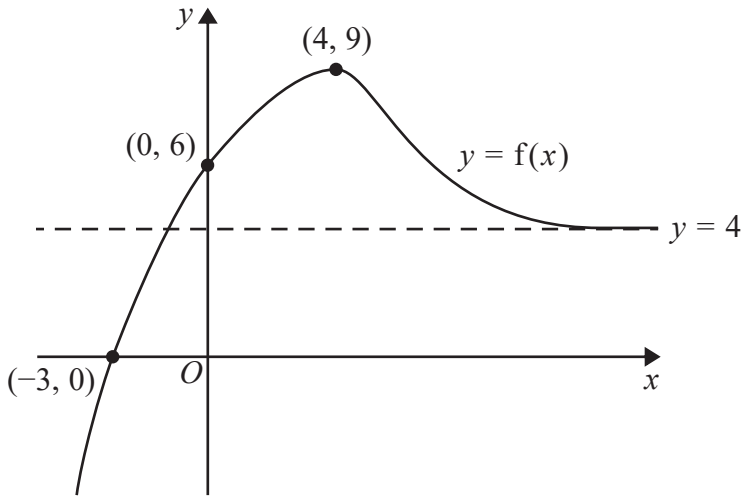


Figure 4

The curve C with equation $y = \mathrm{f}(x)$ is shown in Figure 4.

The curve C

- has a single turning point, a maximum at (4, 9)
- crosses the coordinate axes at only two places, (−3, 0) and (0, 6)
- has a single asymptote with equation $y = 4$

as shown in Figure 4.

(a) State the equation of the asymptote to the curve with equation $y = \mathrm{f}(-x)$.

(1)

(b) State the coordinates of the turning point on the curve with equation $y = \mathrm{f}\left(\frac{1}{4}x\right)$.

(1)

Given that the line with equation $y = k$, where k is a constant, intersects C at exactly one point,

(c) state the possible values for k.

(2)

The curve C is transformed to a new curve that passes through the origin.

(d) (i) Given that the new curve has equation $y = \mathrm{f}(x) - a$, state the value of the constant a.

(ii) Write down an equation for another single transformation of C that also passes through the origin.

(2)

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Question 8 continued

Q8

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9. The equation

$$\frac{3}{x} + 5 = -2x + c$$

where c is a constant, has no real roots.

Find the range of possible values of c.

(7)

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