



QUESTION 1

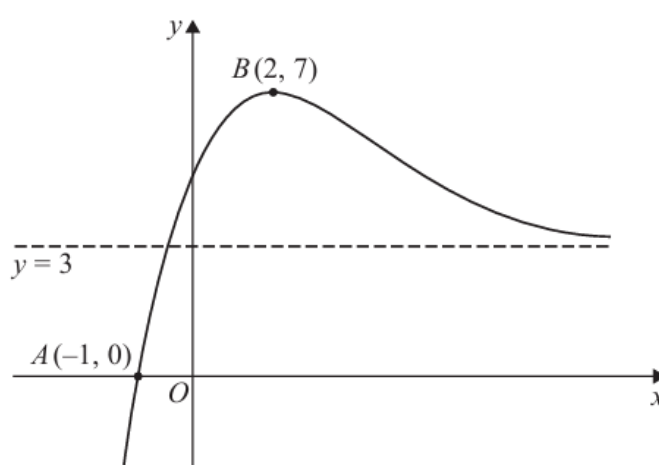


Figure 1

Figure 1 shows a curve with equation $y = f(x)$

The curve

- passes through the point $A(-1, 0)$
- has a maximum turning point at $B(2, 7)$
- has a horizontal asymptote with equation $y = 3$

On separate diagrams, sketch the curve with equation

(i) $y = f(x + 2)$

(3)

(ii) $y = -f(x)$

(3)

On each diagram, show clearly the coordinates of the points to which A and B are transformed and the equation of the asymptote.

Question 2

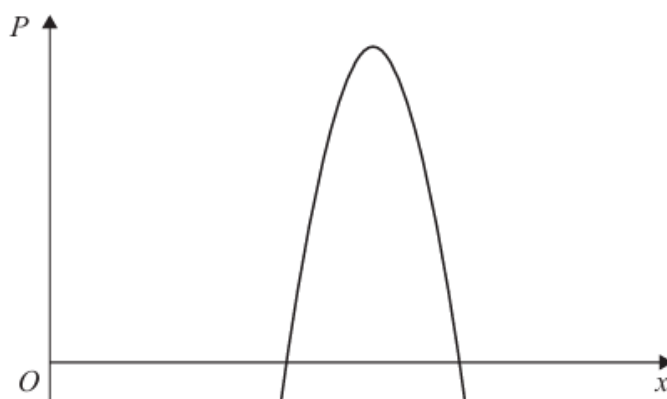


Figure 3

A company makes a particular type of chair.

The annual profit made by the company is modelled by the equation

$$P = -x^2 + 260x - 16450$$

where P is the profit measured in **thousands** of pounds and x is the selling price of the chair in pounds.

The graph of P against x is shown in Figure 3.

Using the model,

- (a) explain why £175 is not a sensible selling price for the chair. (2)

Given that the company made an annual profit of more than £200 000

- (b) find, according to the model, the highest possible selling price for the chair.

You must show your working clearly.

(3)

- (c) Show that

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

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

(3)

The company wishes to maximise its annual profit.

State, according to the model,

- (d) (i) the maximum possible annual profit,
 (ii) the selling price of the chair that maximises the annual profit.

(2)

Question 7

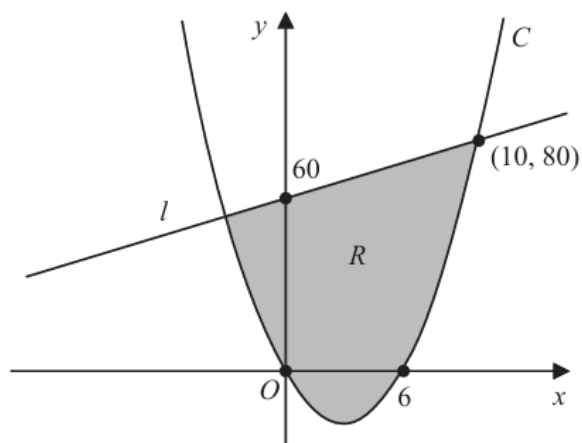


Figure 3

Figure 3 shows a sketch of a curve C and a straight line l .

Given that

- C has equation $y = f(x)$ where $f(x)$ is a quadratic expression in x
- C cuts the x -axis at 0 and 6
- l cuts the y -axis at 60 and intersects C at the point $(10, 80)$

use inequalities to define the region R shown shaded in Figure 3.

(5)
