













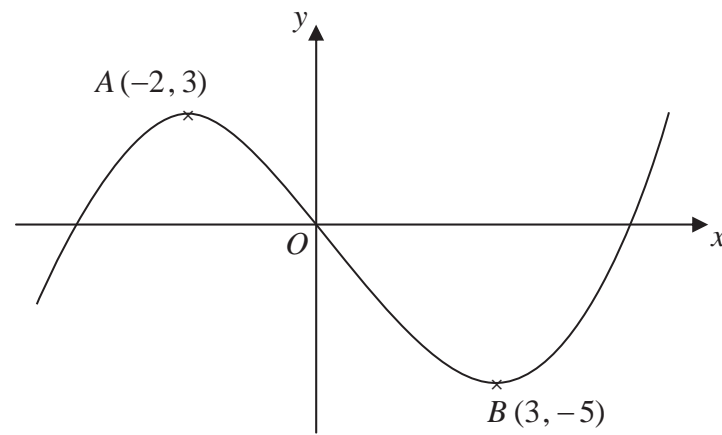








6.



**Figure 1**

Figure 1 shows a sketch of the curve with equation  $y = f(x)$ . The curve has a maximum point  $A$  at  $(-2, 3)$  and a minimum point  $B$  at  $(3, -5)$ .

On separate diagrams sketch the curve with equation

(a)  $y = f(x+3)$  **(3)**

(b)  $y = 2f(x)$  **(3)**

On each diagram show clearly the coordinates of the maximum and minimum points.

The graph of  $y = f(x)+a$  has a minimum at  $(3, 0)$ , where  $a$  is a constant.

(c) Write down the value of  $a$ . **(1)**



**Question 6 continued**

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**(Total 7 marks)**

**Q6**

























10. (a) On the axes below sketch the graphs of

(i)  $y = x(4-x)$

(ii)  $y = x^2(7-x)$

showing clearly the coordinates of the points where the curves cross the coordinate axes.

(5)

(b) Show that the  $x$ -coordinates of the points of intersection of

$$y = x(4-x) \quad \text{and} \quad y = x^2(7-x)$$

are given by the solutions to the equation  $x(x^2 - 8x + 4) = 0$

(3)

The point  $A$  lies on both of the curves and the  $x$  and  $y$  coordinates of  $A$  are both positive.

(c) Find the exact coordinates of  $A$ , leaving your answer in the form  $(p + q\sqrt{3}, r + s\sqrt{3})$ , where  $p, q, r$  and  $s$  are integers.

(7)

