Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Transforming Graphs 2

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

Write your name in the space provided.

Write your answers in the spaces provided in this question paper.

Answer ALL questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You should have a ruler, compass and protractor where required.

Total Marks :

1) **Fig. 1** below shows a sketch of the graph of the function $y = f(x)$.
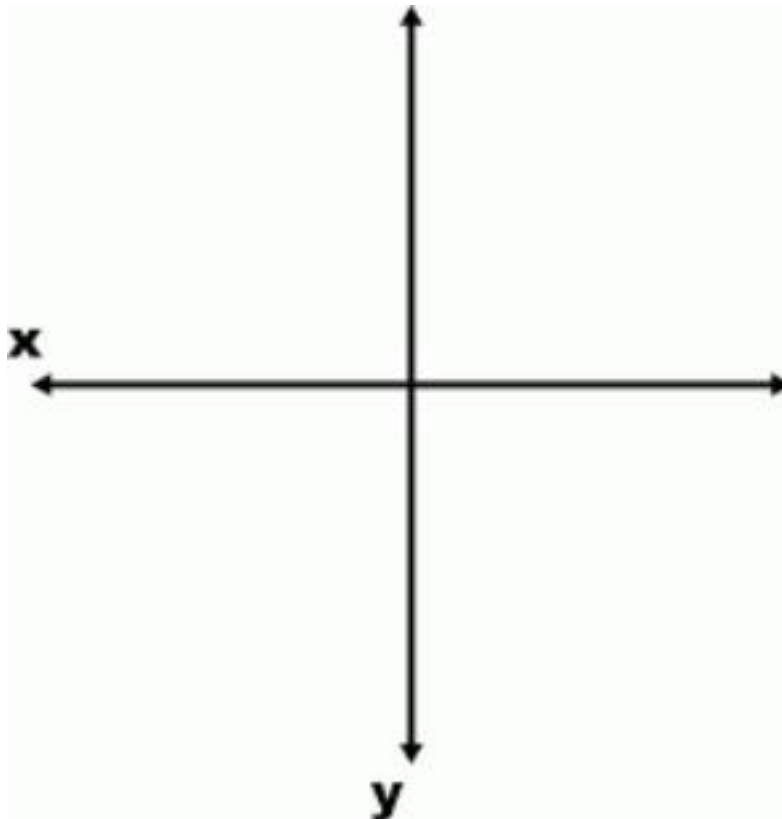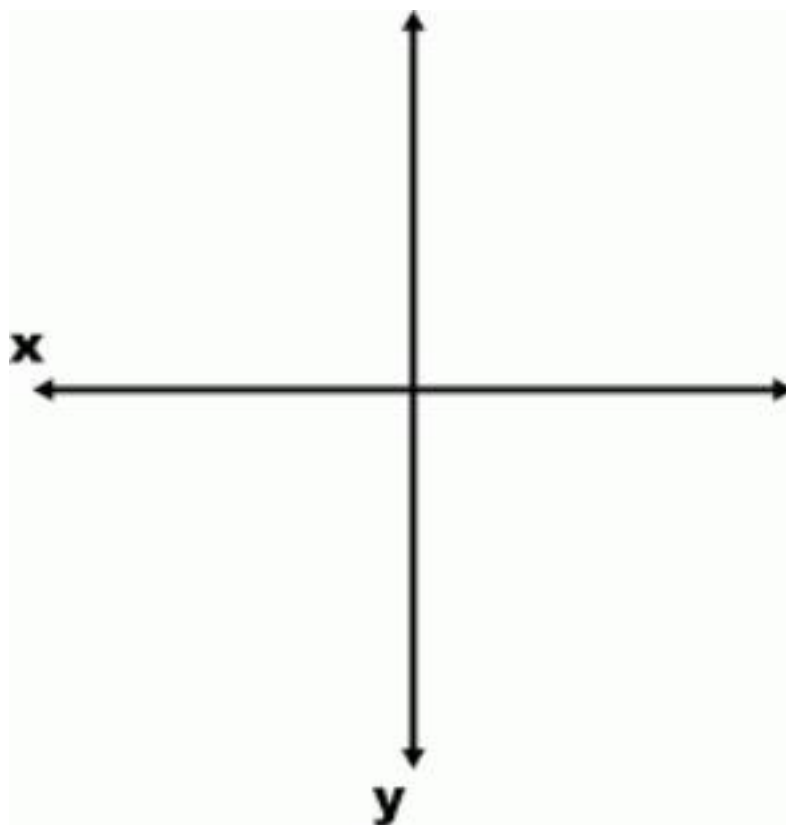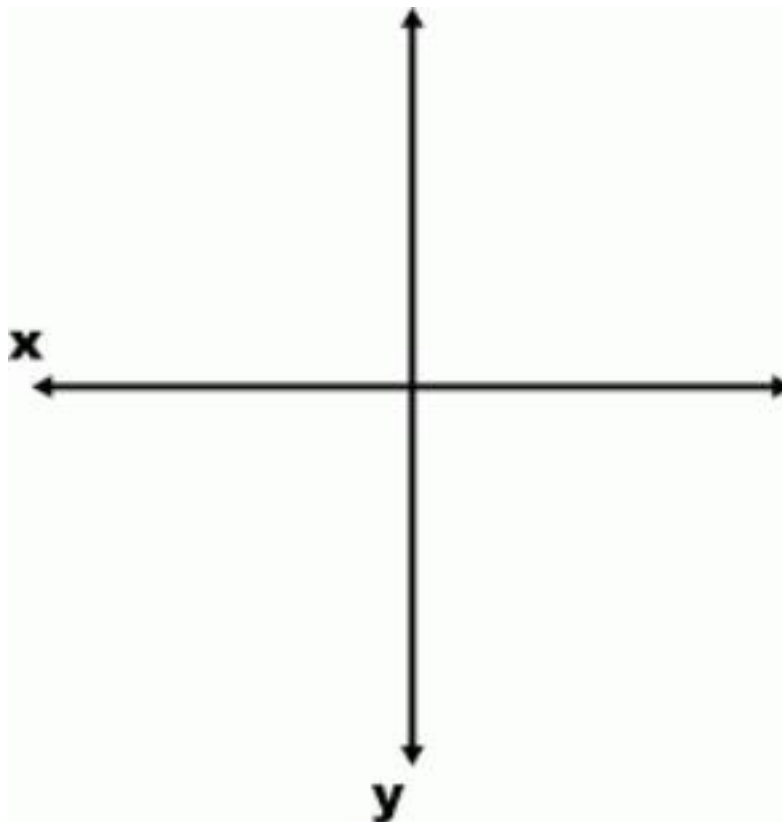The point A (3, 2) lies on the graph.
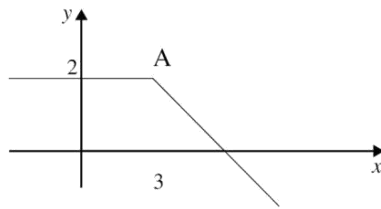
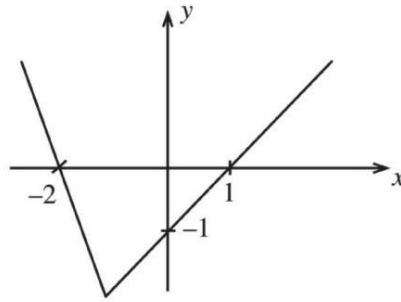**Fig. 1**

On separate diagrams draw sketches of the graphs of:

(i) $y = f(-x)$; [2]

(ii) $y = f(x + 1)$; [2]

(iii) $y = 2f(x)$, [2]

clearly labelling the images of the point A.

x

y

x

y

2) The diagram in **Fig. 1** below shows the graph of the function $y = f(x)$

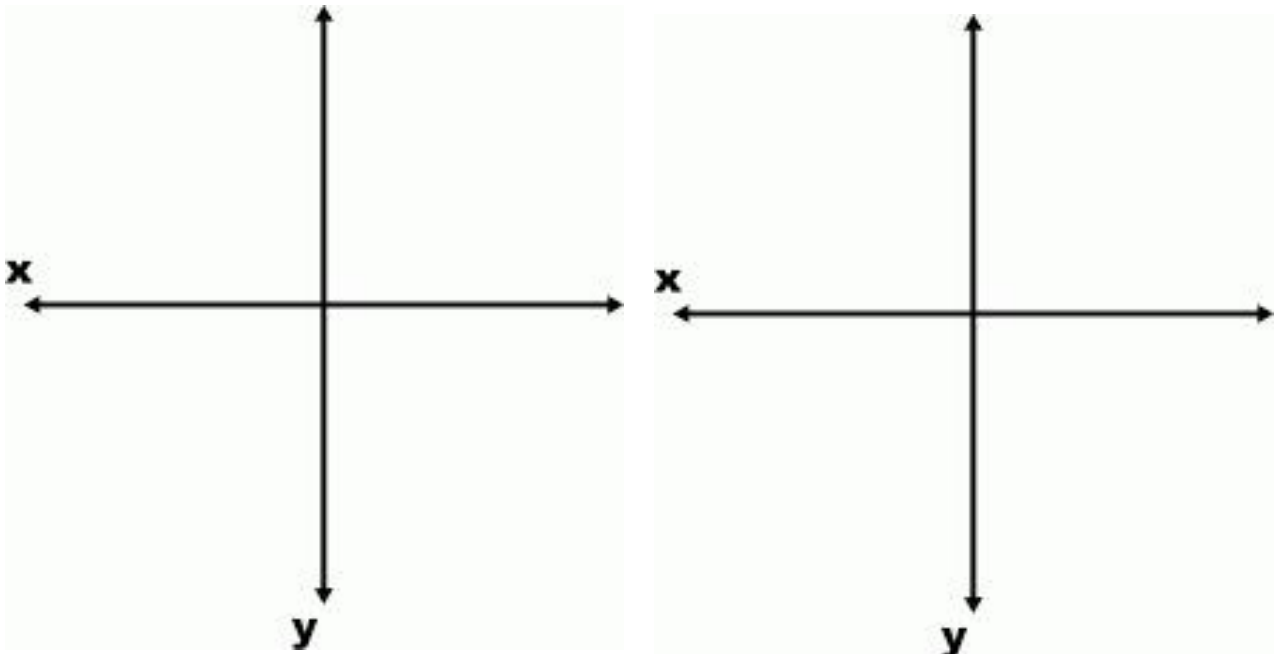**Fig. 1**

Sketch, on separate diagrams, the graphs of:
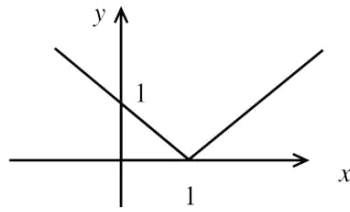
(i) $y = -f(x)$;　　　　　　　　　　　　　　　　　　　　　　　[2]

(ii) $y = f(x - 2)$,　　　　　　　　　　　　　　　　　　　　　[2]

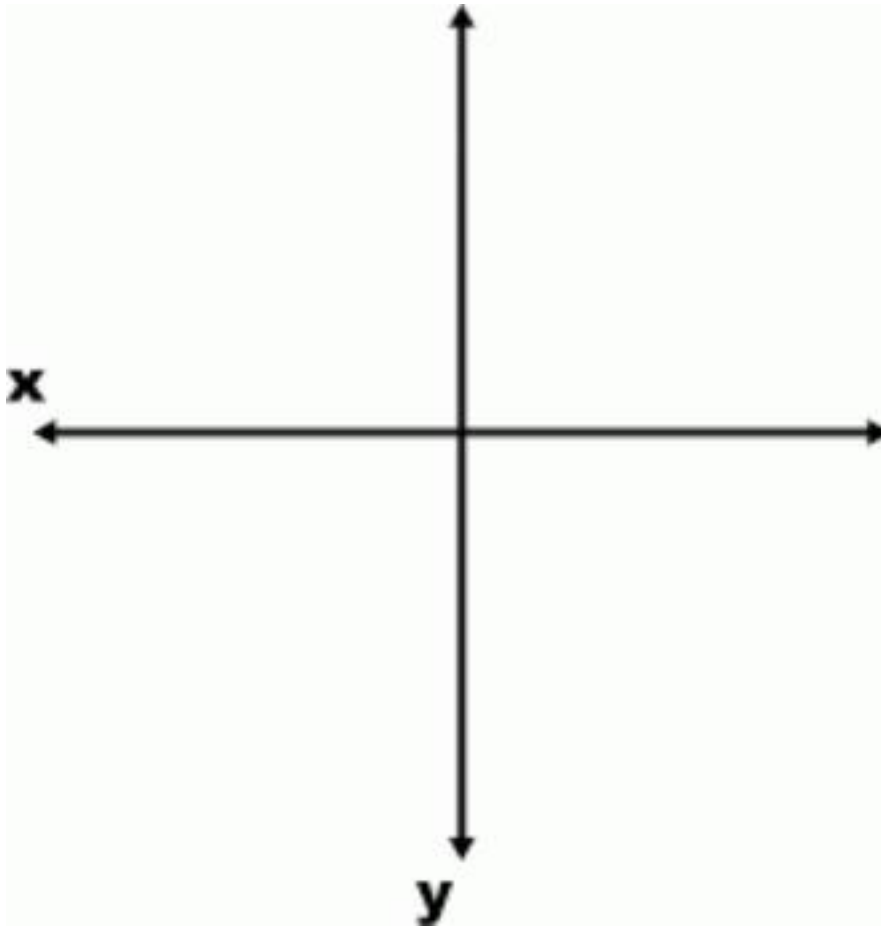clearly identifying the points where the graphs cross the axes.

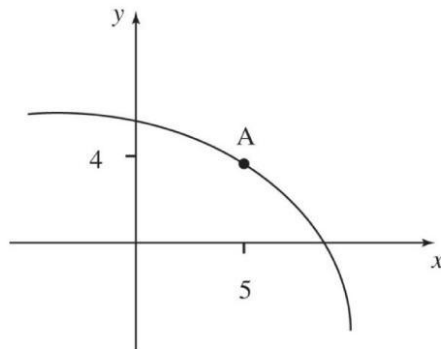3) **Fig. 2** below shows the graph of the function $y = f(x)$

Fig. 2

Sketch the graph of $y = f(2x)$ clearly identifying the points where the graph crosses or touches the axes. [2]

4) The diagram in **Fig. 1** below shows the graph of the curve $y = f(x)$. The point A, (5, 4), lies on the curve.
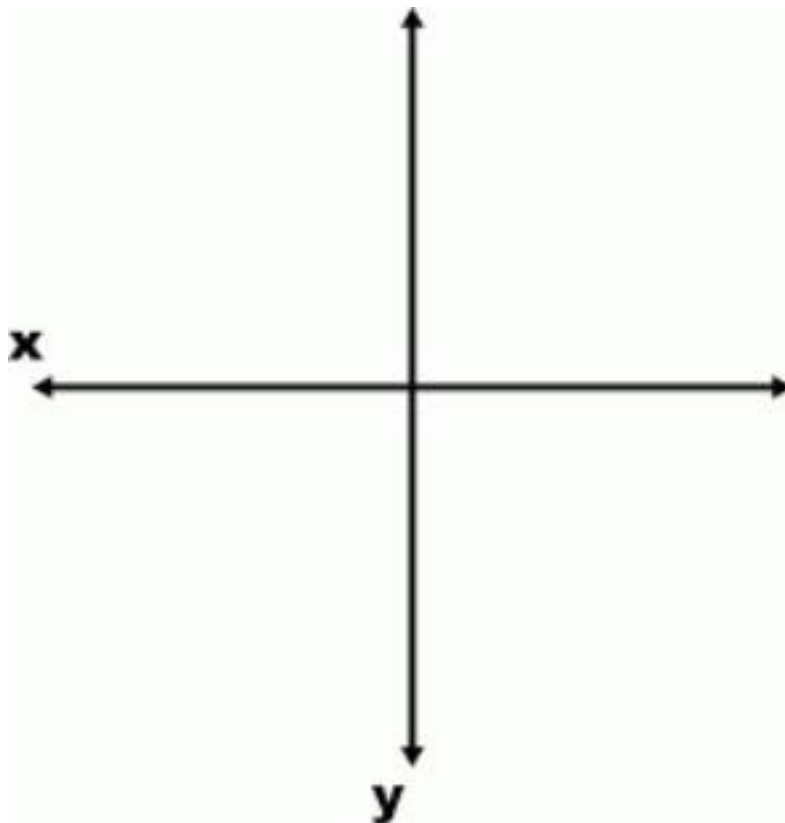

Fig. 1
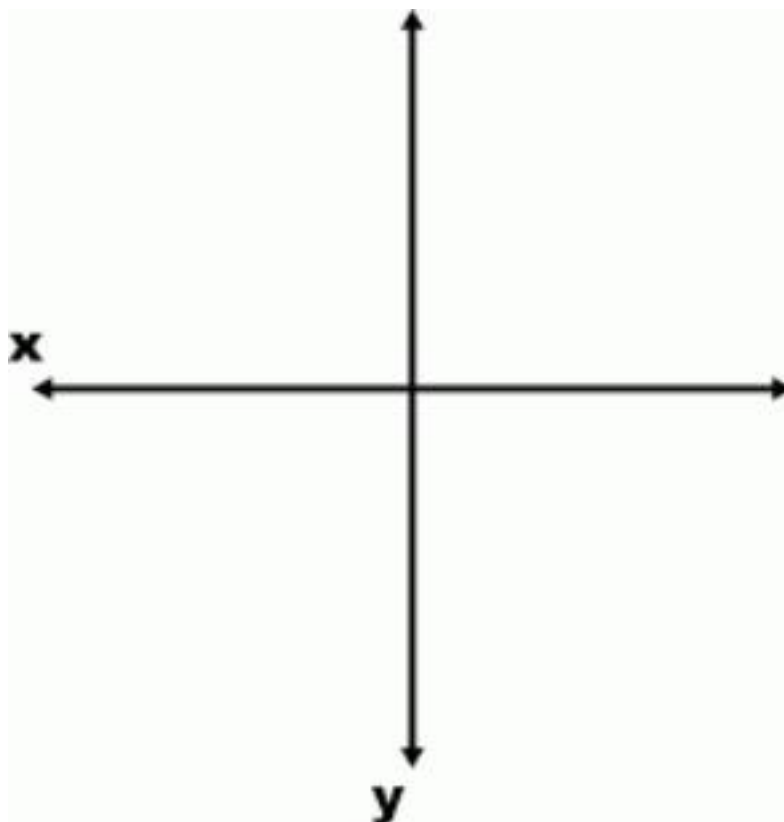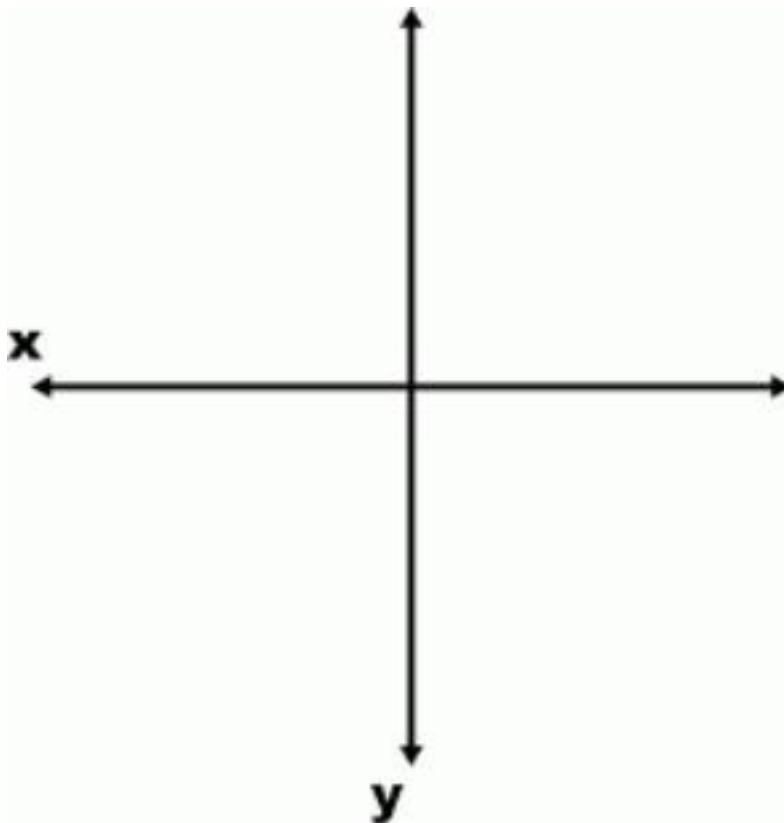
Sketch, on separate diagrams, the graphs of:

(i) $y = f(x) - 1$ [2]

(ii) $y = -f(x)$ [2]

(iii) $y = f(2x)$ [2]

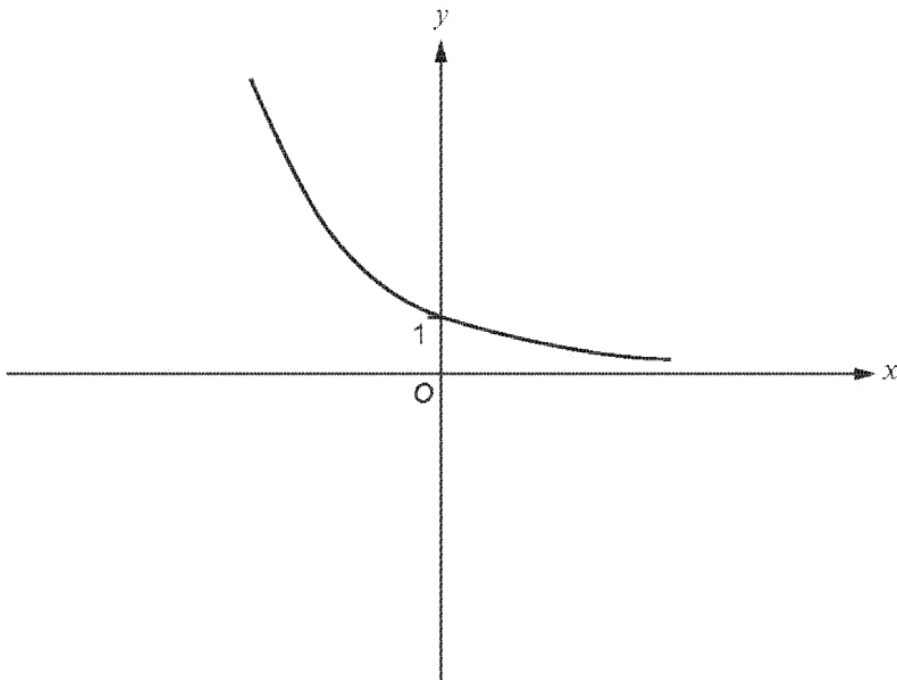clearly indicating the image of the point A on each sketch.

x

y

x

y

5) *(a)* The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 5$.
Mark clearly the value of y at the point where your curve crosses the y-axis. [2]
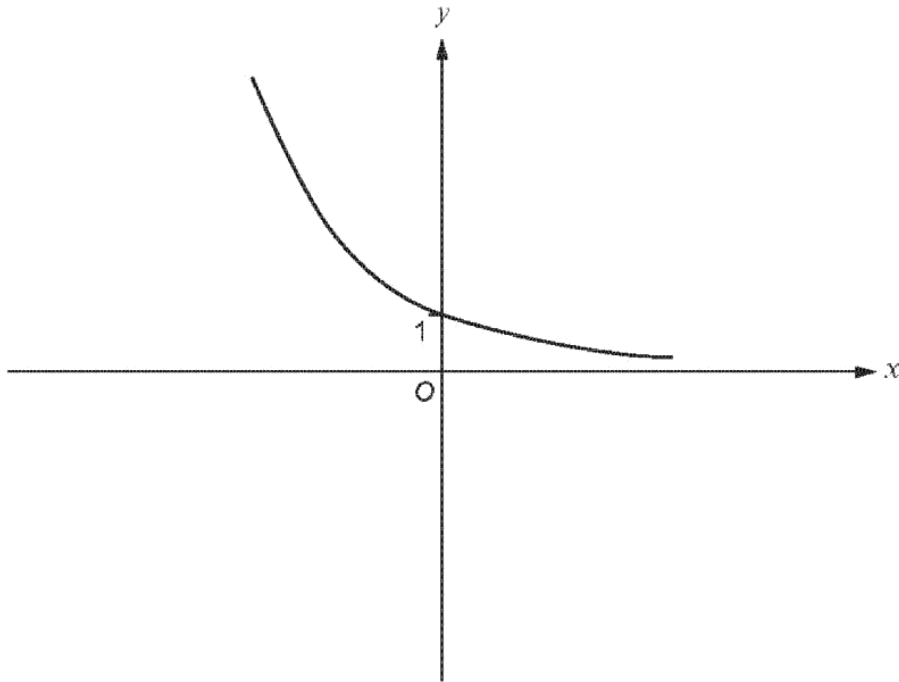
(b) This diagram again shows a sketch of $y = f(x)$.
On this diagram, sketch the curve $y = -f(x)$.
Mark clearly the value of y at the point where your curve crosses the y-axis. [2]

6) *(a)* The diagram below shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x + 3)$.
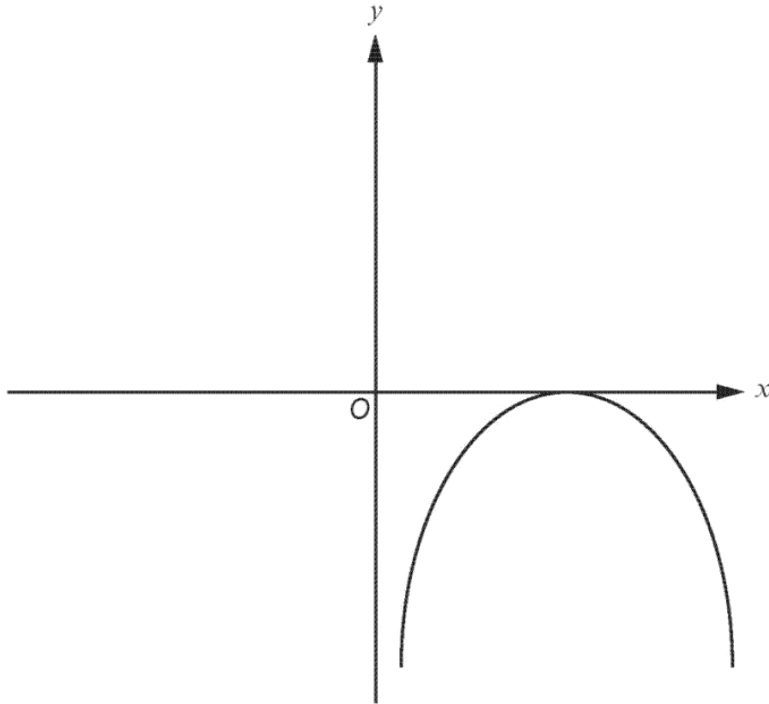Mark clearly the coordinates of the point where this curve touches an axis. [2]
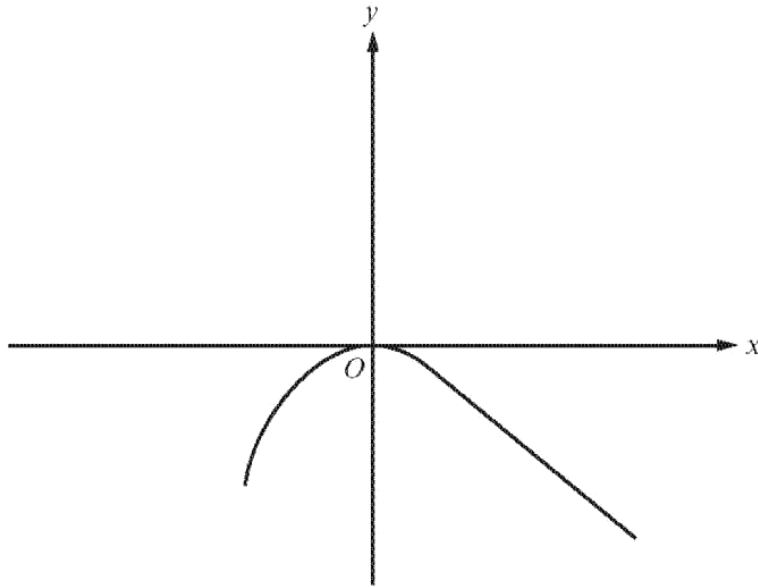
(b) The diagram below shows another sketch of $y = f(x)$.
On the same diagram below
   - sketch the curve $y = -f(x)$, then
   - sketch the curve $y = -f(x) + 2$.

Mark clearly the coordinates of the point where the curve $y = -f(x) + 2$ meets the y-axis. [3]
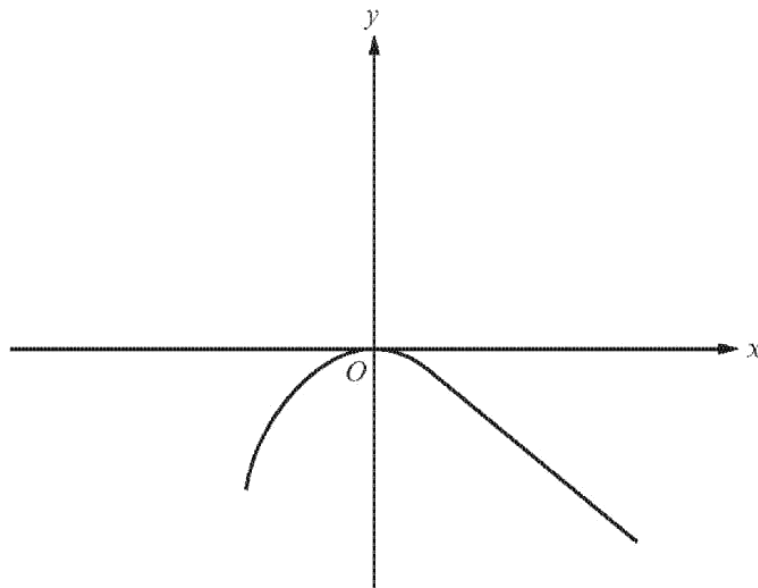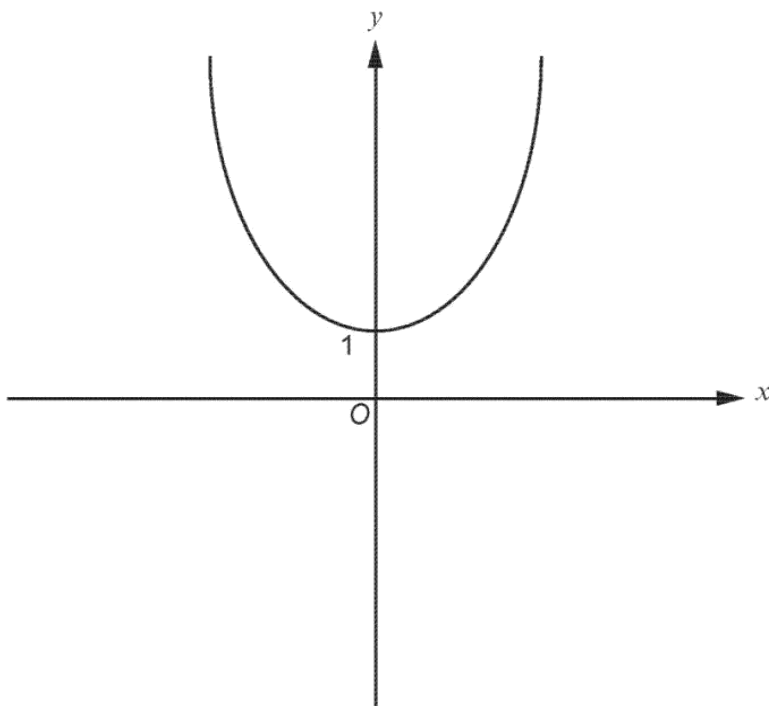
7) *(a)*   This diagram shows a sketch of the curve $y = f(x)$.
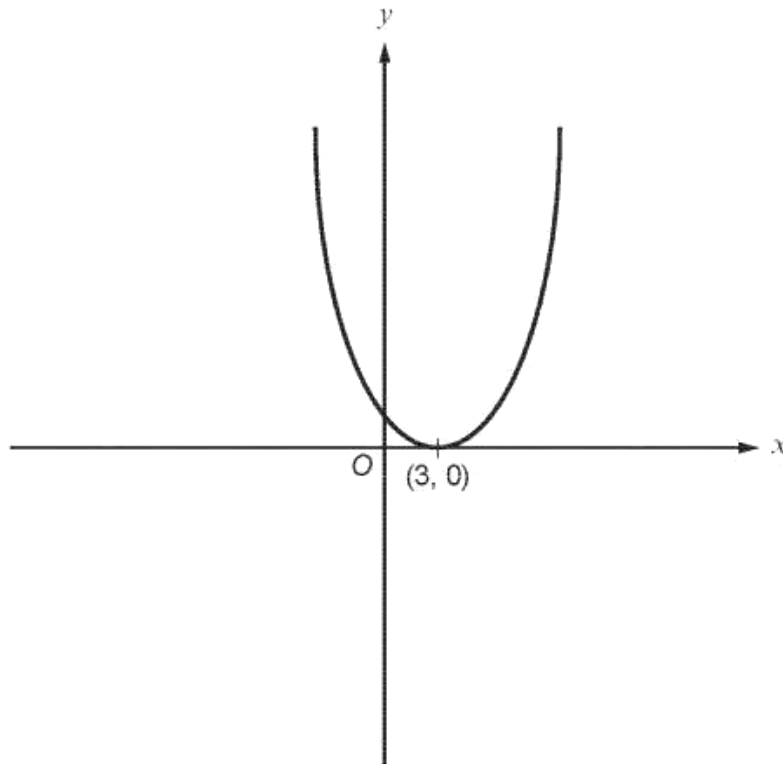On the same diagram, sketch the curve $y = -f(x)$.   [1]

(b)   This diagram shows a sketch of the curve $y = g(x)$.
On the same diagram, sketch the curve $y = g(2x)$.   [1]
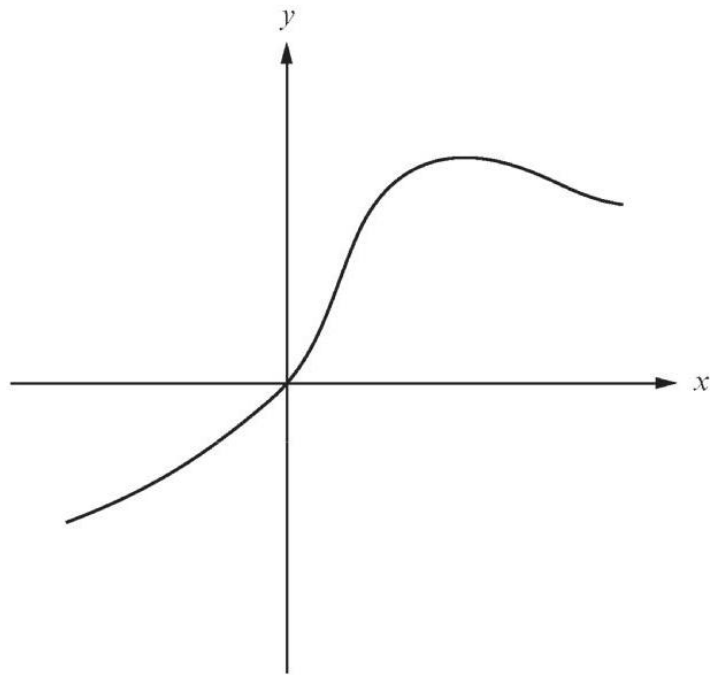
8) The graph shows a sketch of the curve with equation $y = x^2 - 6x + 9$.
The lowest point of the curve has coordinates (3, 0).

On the same axes, sketch the graph of the curve with equation $y = (x - 5)^2 - 6(x - 5) + 9$.
Indicate clearly the coordinates of the lowest point on the new curve. [2]

9) The diagram shows a sketch of $y = f(x)$.
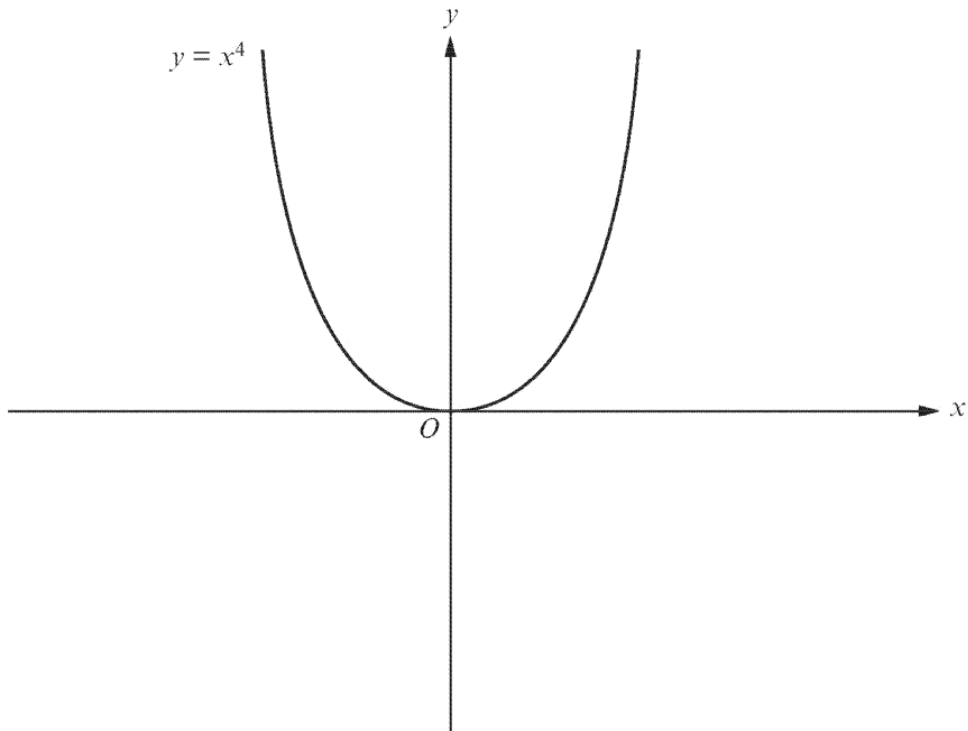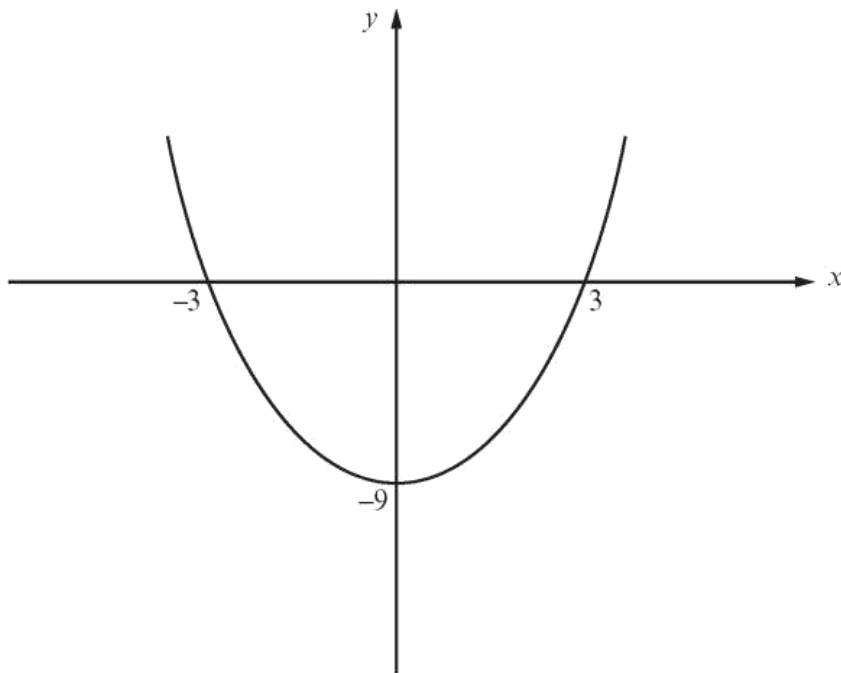   On the same diagram, sketch the curve $y = -f(x)$.

[1]

10) The diagram shows a sketch of $y = x^4$.
On the same diagram, sketch the curves $y = -x^4$ and $y = -x^4 - 3$.
Clearly label each graph with its equation, and indicate the coordinates of any point where a curve crosses an axis.   [3]
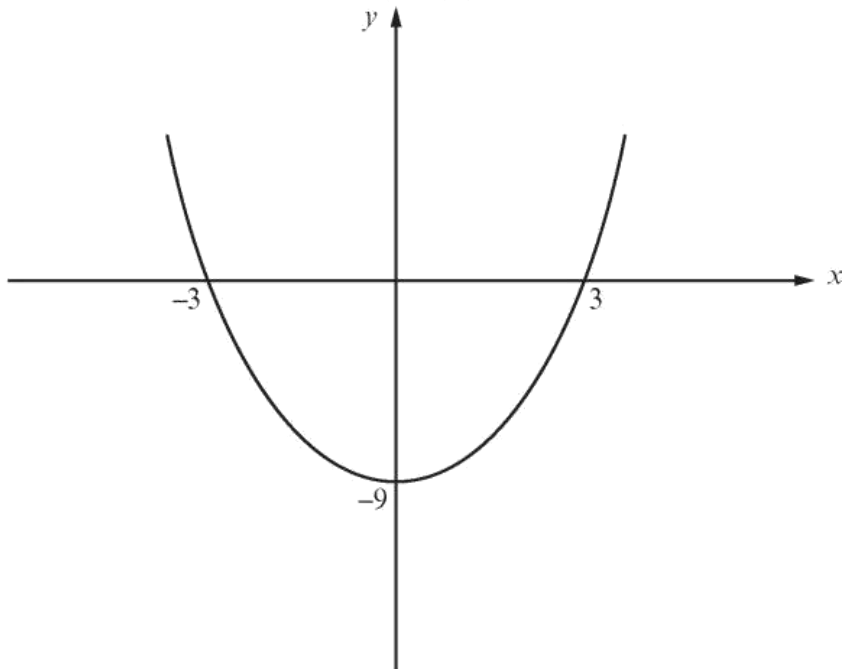
11) *(a)*   The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 3$.
Mark clearly the coordinates of the point where the curve crosses the y-axis.

[2]

(b)   The diagram shows another sketch of $y = f(x)$.

(i)   On the same diagram, sketch the curve $y = f(x + 3)$.
Mark clearly the coordinates of any points where the curve crosses the x-axis.

[2]

(ii)   State the minimum value of $y = f(x + 3)$.

Minimum value is ....

[1]

(c) The function $y = f(x)$, as shown in the original sketches, represents one of the following equations.
State which of the following equations it is.

$y = 3x - 9$ $\qquad$ $y = x^2 + 9$ $\qquad$ $y = x^3$ $\qquad$ $y = x^2 - 9$

$y = 3x^2$ $\qquad$ $y = -x^2 - 9$ $\qquad$ $y = x^3 + 9$ $\qquad$ $y = -x^2 + 9$

[1]