Transformations of graphs Difficulty : Easy

Question Paper 2

Level	AS & A Level
Subject	Maths - Pure
Exam Board	Edexcel
Topic	Graphs and transformations
Sub-Topic	Transformations of graphs
Difficulty	Easy
Booklet	Question Paper 2

Time allowed: **44 minutes**

Score: **/37**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>76%	61%	52%	42%	33%	23%	<23%

Question 1

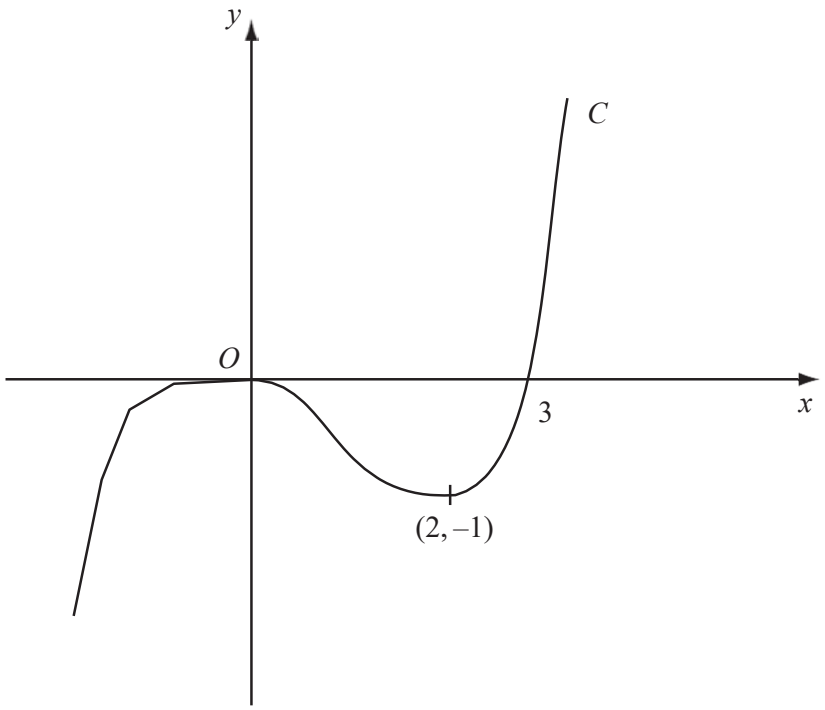

Figure 1

Figure 1 shows a sketch of the curve C with equation $y = f(x)$. There is a maximum at (0, 0), a minimum at (2, –1) and C passes through (3, 0).

On separate diagrams sketch the curve with equation

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

(b) $y = f(-x)$. **(3)**

On each diagram show clearly the coordinates of the maximum point, the minimum point and any points of intersection with the x-axis.

(Total 6 marks)

(a) Factorise completely $x^3 - 6x^2 + 9x$ **(3)**

(b) Sketch the curve with equation

$$y = x^3 - 6x^2 + 9x$$

showing the coordinates of the points at which the curve meets the x-axis. **(4)**

Using your answer to part (b), or otherwise,

(c) sketch, on a separate diagram, the curve with equation

$$y = (x - 2)^3 - 6(x - 2)^2 + 9(x - 2)$$

showing the coordinates of the points at which the curve meets the x-axis. **(2)**

(Total 9 marks)

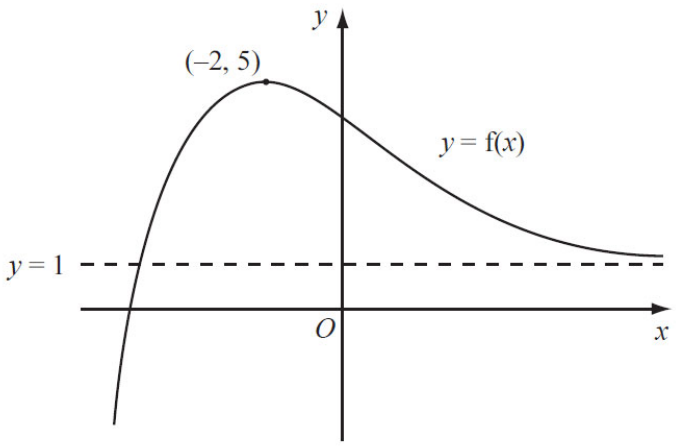

Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = f(x)$.

The curve has a maximum point $(-2, 5)$ and an asymptote $y = 1$, as shown in Figure 1.

On separate diagrams, sketch the curve with equation

(a) $y = f(x) + 2$ **(2)**

(b) $y = 4f(x)$ **(2)**

(c) $y = f(x + 1)$ **(3)**

On each diagram, show clearly the coordinates of the maximum point and the equation of the asymptote.

(Total 7 marks)

Question 4

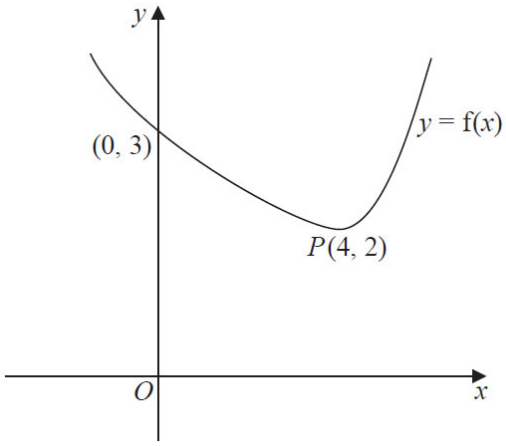

Figure 1

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

The curve crosses the y-axis at (0, 3) and has a minimum at P (4, 2).

On separate diagrams, sketch the curve with equation

(a) $y = f(x + 4)$, **(2)**

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

On each diagram, show clearly the coordinates of the minimum point and any point of intersection with the y-axis.

(Total 4 marks)

Question 5

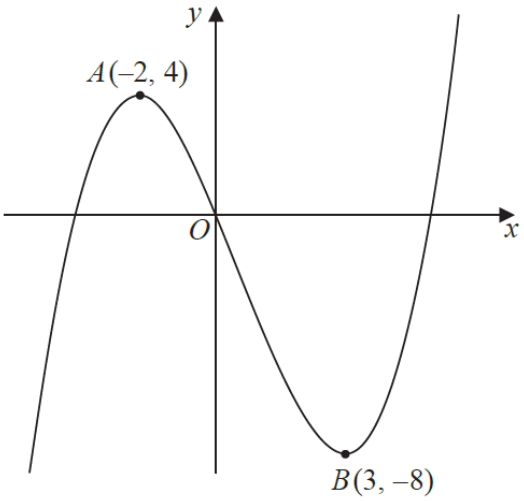

Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = f(x)$. The curve has a maximum point A at $(–2, 4)$ and a minimum point B at $(3, –8)$ and passes through the origin O.

On separate diagrams, sketch the curve with equation

(a) $y = 3f(x)$, **(2)**

(b) $y = f(x) – 4$ **(3)**

On each diagram, show clearly the coordinates of the maximum and the minimum points and the coordinates of the point where the curve crosses the y-axis.

(Total 5 marks)

Question 6

Figure 1

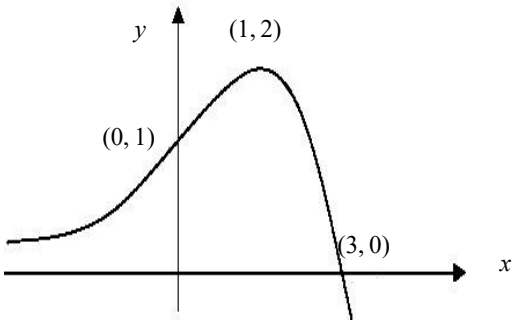

Figure 1 shows a sketch of the curve with equation $y = f(x)$.

The curve crosses the coordinate axes at the points (0, 1) and (3, 0). The maximum point on the curve is (1, 2).

On separate diagrams, sketch the curve with equation

(a) $y = f(x + 1)$, **(3)**

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

On each diagram, show clearly the coordinates of the maximum point, and of each point at which the curve crosses the coordinate axes.

(Total 6 marks)