Graphs and Transformations - Edexcel Past Exam Questions 2

1.

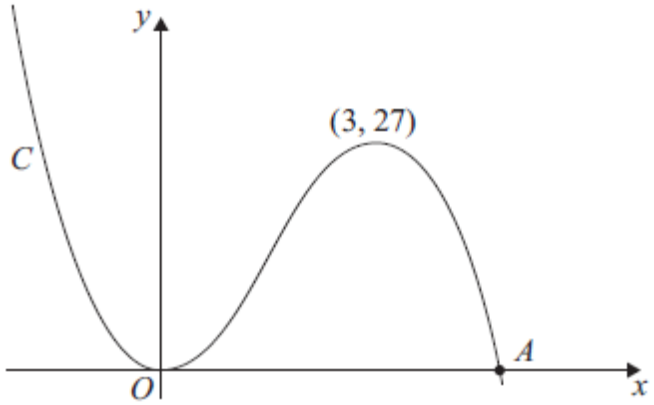

Figure 1

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

$$f(x) = x^2(9 - 2x).$$

There is a minimum at the origin, a maximum at the point (3, 27) and C cuts the x-axis at the point A.

(a) Write down the coordinates of the point A. **(1)**

(b) On separate diagrams sketch the curve with equation

(i) $y = f(x + 3)$,

(ii) $y = f(3x)$.

On each sketch you should indicate clearly the coordinates of the maximum point and any points where the curves cross or meet the coordinate axes. **(6)**

The curve with equation $y = f(x) + k$, where k is a constant, has a maximum point at (3, 10).

(c) Write down the value of k. **(1)**

June 12 Q10

2.

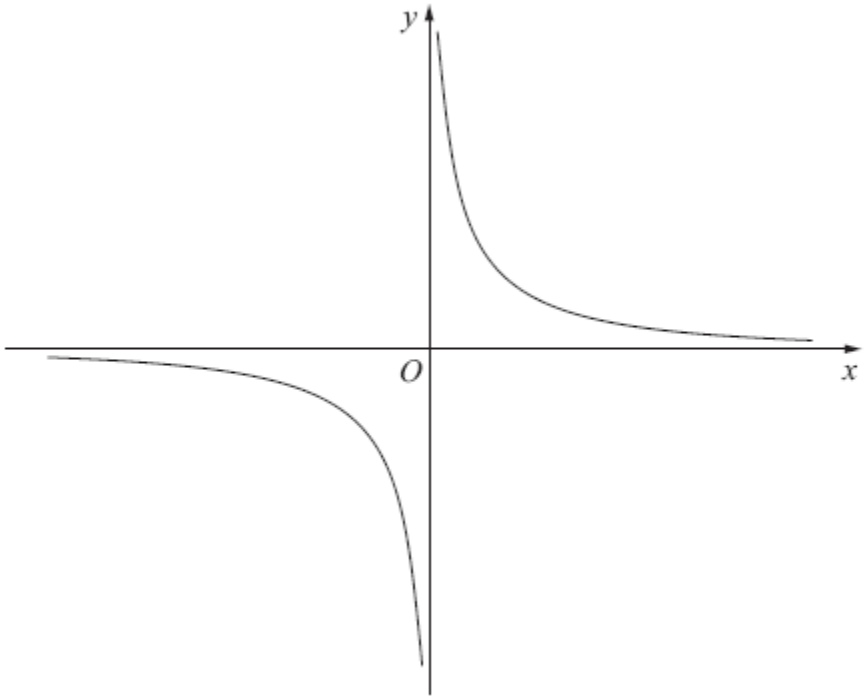

Figure 1

Figure 1 shows a sketch of the curve with equation $y = \frac{2}{x}$, $x \neq 0$.

The curve C has equation $y = \frac{2}{x} - 5$, $x \neq 0$, and the line l has equation $y = 4x + 2$.

(a) Sketch and clearly label the graphs of C and l on a single diagram.

On your diagram, show clearly the coordinates of the points where C and l cross the coordinate axes. **(5)**

(b) Write down the equations of the asymptotes of the curve C. **(2)**

(c) Find the coordinates of the points of intersection of $y = \frac{2}{x} - 5$ and $y = 4x + 2$. **(5)**

Jan 13 Q6

3.

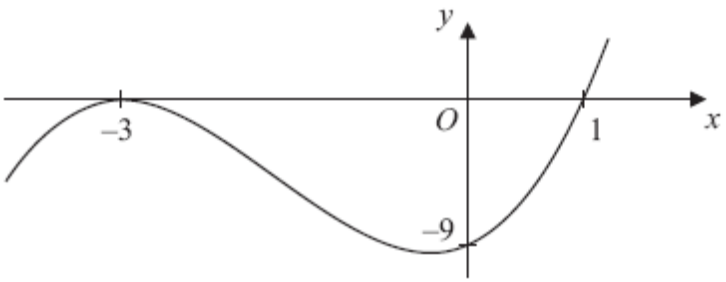

Figure 1

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

$$f(x) = (x + 3)^2 (x - 1), \qquad x \in \mathbb{R}.$$

The curve crosses the x-axis at $(1, 0)$, touches it at $(–3, 0)$ and crosses the y-axis at $(0, –9)$.

(a) Sketch the curve C with equation $y = f(x + 2)$ and state the coordinates of the points where the curve C meets the x-axis. **(3)**

(b) Write down an equation of the curve C. **(1)**

(c) Use your answer to part (b) to find the coordinates of the point where the curve C meets the y-axis. **(2)**

June 13 Q8

4.

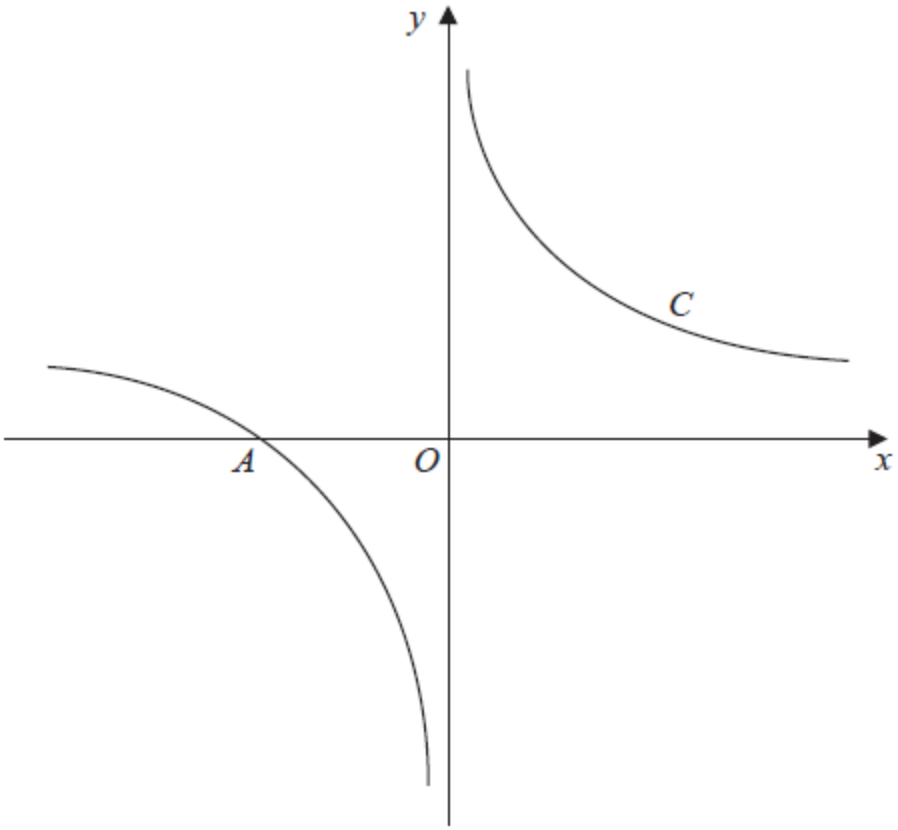

Figure 1

Figure 1 shows a sketch of the curve C with equation

$$y = \frac{1}{x} + 1, \qquad x \neq 0.$$

The curve C crosses the x-axis at the point A.

(a) State the x-coordinate of the point A. **(1)**

The curve D has equation $y = x^2(x - 2)$, for all real values of x.

(b) On a copy of Figure 1, sketch a graph of curve D. Show the coordinates of each point where the curve D crosses the coordinate axes. **(3)**

(c) Using your sketch, state, giving a reason, the number of real solutions to the equation

$$x^2(x - 2) = \frac{1}{x} + 1.$$

(1)

June 14 Q4

5.

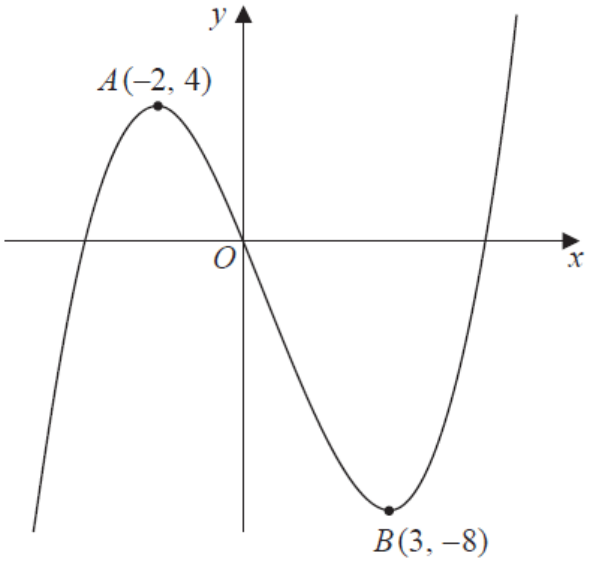

Figure 1

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.

June 16 Q4

6. (*a*) On separate axes sketch the graphs of

(i) $y = -3x + c$, where c is a positive constant,

(ii) $y = \frac{1}{x} + 5$

On each sketch show the coordinates of any point at which the graph crosses the y-axis and the equation of any horizontal asymptote. **(4)**

Given that $y = -3x + c$, where c is a positive constant, meets the curve $y = \frac{1}{x} + 5$ at two distinct points,

(*b*) show that $(5 - c)^2 > 12$ **(3)**

(*c*) Hence find the range of possible values for c. **(4)**

June 17 Q9