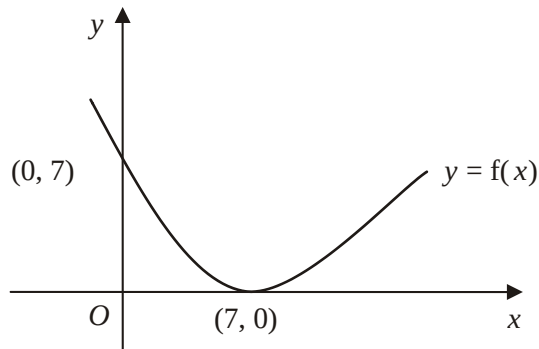


Year 1 Pure Chapter 4: Sketching Graphs and Transformations
Exam Questions (Total Marks 57)

1.



The diagram above shows a sketch of the curve with equation $y = f(x)$. The curve passes through the point $(0, 7)$ and has a minimum point at $(7, 0)$.

On separate diagrams, sketch the curve with equation

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

(3)

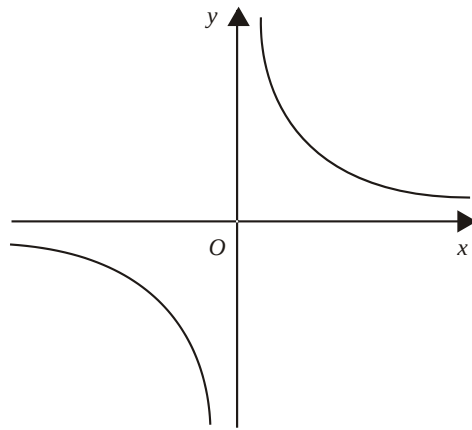
(b) $y = f(2x)$.

(2)

On each diagram, show clearly the coordinates of the minimum point and the coordinates of the point at which the curve crosses the y -axis.

(Total 5 marks)

2.



The diagram above shows a sketch of the curve with equation $y = \frac{3}{x}$, $x \neq 0$.

- (a) On a separate diagram, sketch the curve with equation $y = \frac{3}{x+2}$, $x \neq -2$, showing the coordinates of any point at which the curve crosses a coordinate axis.

(3)

- (b) Write down the equations of the asymptotes of the curve in part (a).

(2)

(Total 5 marks)

3. On separate diagrams, sketch the graphs of

(a) $y = (x + 3)^2$,

(3)

(b) $y = (x + 3)^2 + k$, where k is a positive constant.

(2)

Show on each sketch the coordinates of each point at which the graph meets the axes.

(Total 5 marks)

4. Given that $f(x) = \frac{1}{x}, \quad x \neq 0,$

(a) sketch the graph of $y = f(x) + 3$ and state the equations of the asymptotes.

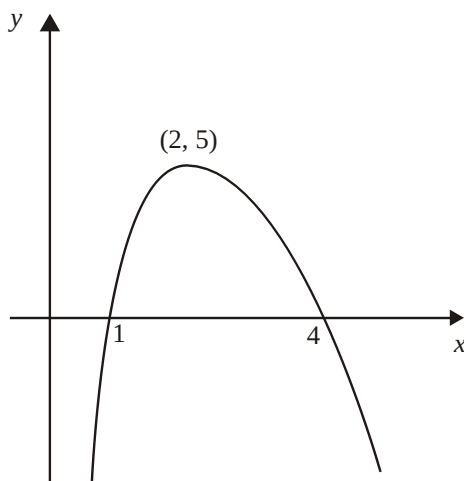
(4)

(b) Find the coordinates of the point where $y = f(x) + 3$ crosses a coordinate axis.

(2)

(Total 6 marks)

5.



The diagram above shows a sketch of the curve with equation $y = f(x)$. The curve crosses the x -axis at the points $(1, 0)$ and $(4, 0)$. The maximum point on the curve is $(2, 5)$. In separate diagrams sketch the curves with the following equations. On each diagram show clearly the coordinates of the maximum point and of each point at which the curve crosses the x -axis.

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

(3)

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

(3)

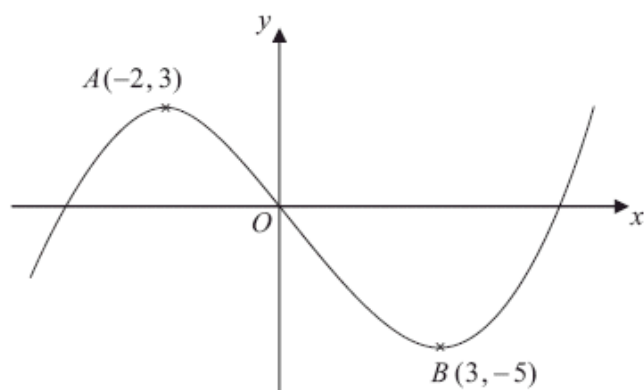
The maximum point on the curve with equation $y = f(x + a)$ is on the y -axis.

(c) Write down the value of the constant a .

(1)

(Total 7 marks)

6.



The diagram above 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)

(Total 7 marks)

7. (a) Factorise completely $x^3 - 4x$.

(3)

(b) Sketch the curve with equation $y = x^3 - 4x$, showing the coordinates of the points where the curve crosses the x -axis.

(3)

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

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

showing the coordinates of the points where the curve crosses the x -axis.

(3)

(Total 9 marks)

8. (a) On the same axes sketch the graphs of the curves with equations

(i) $y = x^2(x - 2)$, **(3)**

(ii) $y = x(6 - x)$, **(3)**

and indicate on your sketches the coordinates of all the points where the curves cross the x -axis.

(b) Use algebra to find the coordinates of the points where the graphs intersect.

(7)
(Total 13 marks)