

1. Find the value of

(a) $25^{\frac{1}{2}}$

(1)

(b) $25^{-\frac{3}{2}}$

(2)

Q1

(Total 3 marks)



8.

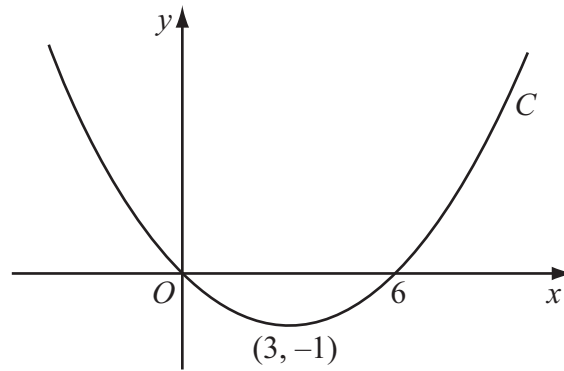
**Figure 1**

Figure 1 shows a sketch of the curve C with equation $y = f(x)$.
 The curve C passes through the origin and through $(6, 0)$.
 The curve C has a minimum at the point $(3, -1)$.

On separate diagrams, sketch the curve with equation

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

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

(c) $y = f(x + p)$, where p is a constant and $0 < p < 3$. **(4)**

On each diagram show the coordinates of any points where the curve intersects the x -axis and of any minimum or maximum points.



Question 8 continued



9. (a) Calculate the sum of all the even numbers from 2 to 100 inclusive,

$$2 + 4 + 6 + \dots + 100$$

(3)

(b) In the arithmetic series

$$k + 2k + 3k + \dots + 100$$

k is a positive integer and k is a factor of 100.

(i) Find, in terms of k , an expression for the number of terms in this series.

(ii) Show that the sum of this series is

$$50 + \frac{5000}{k}$$

(4)

(c) Find, in terms of k , the 50th term of the arithmetic sequence

$$(2k + 1), (4k + 4), (6k + 7), \dots,$$

giving your answer in its simplest form.

(2)



10. The curve C has equation

$$y = (x+1)(x+3)^2$$

(a) Sketch C , showing the coordinates of the points at which C meets the axes. (4)

(b) Show that $\frac{dy}{dx} = 3x^2 + 14x + 15$. (3)

The point A , with x -coordinate -5 , lies on C .

(c) Find the equation of the tangent to C at A , giving your answer in the form $y = mx + c$, where m and c are constants. (4)

Another point B also lies on C . The tangents to C at A and B are parallel.

(d) Find the x -coordinate of B . (3)



