

1. Find $\int(3x^2 + 4x^5 - 7) dx$.

(4)

Q1

(Total 4 marks)



2. (a) Write down the value of $16^{\frac{1}{4}}$.

(1)

(b) Simplify $(16x^{12})^{\frac{3}{4}}$.

(2)

Q2

(Total 3 marks)



3. Simplify

$$\frac{5-\sqrt{3}}{2+\sqrt{3}},$$

giving your answer in the form $a + b\sqrt{3}$, where a and b are integers.

(4)

Q3

(Total 4 marks)



4. The point $A(-6, 4)$ and the point $B(8, -3)$ lie on the line L .
- (a) Find an equation for L in the form $ax + by + c = 0$, where a , b and c are integers. (4)
- (b) Find the distance AB , giving your answer in the form $k\sqrt{5}$, where k is an integer. (3)

Q4

(Total 7 marks)



6.

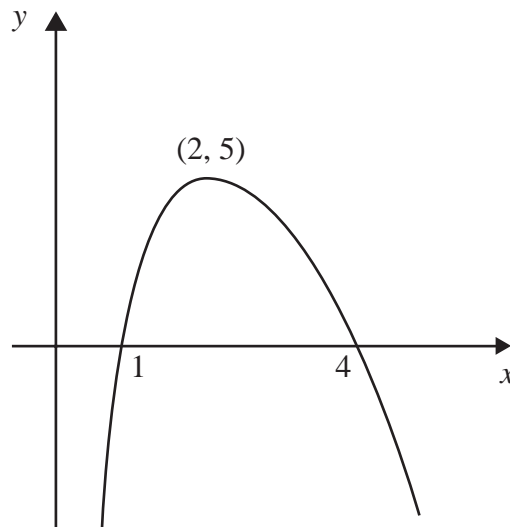
**Figure 1**

Figure 1 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)



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Question 6 continued

(Total 7 marks)

Q6



8. The equation

$$x^2 + kx + 8 = k$$

has no real solutions for x .

(a) Show that k satisfies $k^2 + 4k - 32 < 0$. (3)

(b) Hence find the set of possible values of k . (4)



10. The curve C has equation

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

- (a) Sketch C showing clearly the coordinates of the points where the curve meets the coordinate axes. (4)

- (b) Show that the equation of C can be written in the form

$$y = x^3 + x^2 - 5x + k,$$

where k is a positive integer, and state the value of k . (2)

There are two points on C where the gradient of the tangent to C is equal to 3.

- (c) Find the x -coordinates of these two points. (6)



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Question 10 continued

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Q10

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(Total 12 marks)



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