

Gold Level G2

Question paper

Level	A Level
Exam Board	Edexcel GCE
Subject	Mathematics
Module	Core 1
Difficulty Level	Gold Level G2
Booklet	Question paper

Time Allowed: 90 minutes

Score: /75

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>62	54	46	38	30	<22

1. (a) Evaluate $(32)^{\frac{3}{5}}$, giving your answer as an integer. (2)

(b) Simplify fully $\left(\frac{25x^4}{4}\right)^{-\frac{1}{2}}$. (2)

May 2012

2. The points P and Q have coordinates $(-1, 6)$ and $(9, 0)$ respectively.

The line l is perpendicular to PQ and passes through the mid-point of PQ .

Find an equation for l , giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.

(5)

May 2011

3. A sequence a_1, a_2, a_3, \dots is defined by

$$a_1 = 2,$$

$$a_{n+1} = 3a_n - c$$

where c is a constant.

- (a) Find an expression for a_2 in terms of c .

(1)

Given that $\sum_{i=1}^3 a_i = 0$,

- (b) find the value of c .

(4)

January 2011

4.

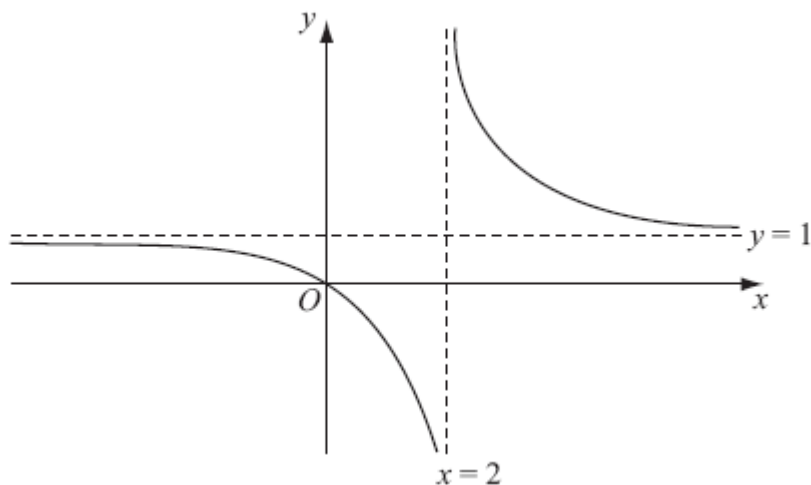


Figure 1

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

$$f(x) = \frac{x}{x-2}, \quad x \neq 2.$$

The curve passes through the origin and has two asymptotes, with equations $y = 1$ and $x = 2$, as shown in Figure 1.

- (a) In the space below, sketch the curve with equation $y = f(x - 1)$ and state the equations of the asymptotes of this curve. (3)
- (b) Find the coordinates of the points where the curve with equation $y = f(x - 1)$ crosses the coordinate axes. (4)

January 2011

5. The equation $x^2 + kx + (k + 3) = 0$, where k is a constant, has different real roots.

- (a) Show that $k^2 - 4k - 12 > 0$. (2)
- (b) Find the set of possible values of k . (4)

May 2007

6.
$$\frac{dy}{dx} = -x^3 + \frac{4x-5}{2x^3}, \quad x \neq 0.$$

Given that $y = 7$ at $x = 1$, find y in terms of x , giving each term in its simplest form.

(6)

January 2013

7. The line L_1 has equation $4y + 3 = 2x$.

The point $A(p, 4)$ lies on L_1 .

(a) Find the value of the constant p .

(1)

The line L_2 passes through the point $C(2, 4)$ and is perpendicular to L_1 .

(b) Find an equation for L_2 giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.

(5)

The line L_1 and the line L_2 intersect at the point D .

(c) Find the coordinates of the point D .

(3)

(d) Show that the length of CD is $\frac{3}{2}\sqrt{5}$.

(3)

A point B lies on L_1 and the length of $AB = \sqrt{80}$.

The point E lies on L_2 such that the length of the line $CDE = 3$ times the length of CD .

(e) Find the area of the quadrilateral $ACBE$.

(3)

May 2012

8. (a) On the axes below sketch the graphs of

(i) $y = x(4 - x)$,

(ii) $y = x^2(7 - x)$,

showing clearly the coordinates of the points where the curves cross the coordinate axes.

(5)

- (b) Show that the x -coordinates of the points of intersection of

$$y = x(4 - x) \quad \text{and} \quad y = x^2(7 - x)$$

are given by the solutions to the equation $x(x^2 - 8x + 4) = 0$.

(3)

The point A lies on both of the curves and the x and y coordinates of A are both positive.

- (c) Find the exact coordinates of A , leaving your answer in the form $(p + q\sqrt{3}, r + s\sqrt{3})$, where p, q, r and s are integers.

(7)

May 2010

9. The curve C has equation

$$y = 2x - 8\sqrt{x} + 5, \quad x \geq 0.$$

- (a) Find $\frac{dy}{dx}$, giving each term in its simplest form.

(3)

The point P on C has x -coordinate equal to $\frac{1}{4}$.

- (b) Find the equation of the tangent to C at the point P , giving your answer in the form $y = ax + b$, where a and b are constants.

(4)

The tangent to C at the point Q is parallel to the line with equation $2x - 3y + 18 = 0$.

- (c) Find the coordinates of Q .

(5)

January 2013

TOTAL FOR PAPER: 75 MARKS

END