

Gold Level G1

Question paper

Level	A Level
Exam Board	Edexcel GCE
Subject	Mathematics
Module	Core 1
Difficulty Level	Gold Level G1
Booklet	Question paper

Time Allowed: 90 minutes

Score: /75

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>66	58	50	42	34	<26

1. Given $y = x^3 + 4x + 1$, find the value of $\frac{dy}{dx}$ when $x = 3$.

(4)

May 2013 (R)

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

(1)

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

(2)

January 2008

3. Find the set of values of x for which

(a) $3(x - 2) < 8 - 2x$,

(2)

(b) $(2x - 7)(1 + x) < 0$,

(3)

(c) both $3(x - 2) < 8 - 2x$ **and** $(2x - 7)(1 + x) < 0$.

(1)

May 2010

4. A 40-year building programme for new houses began in Oldtown in the year 1951 (Year 1) and finished in 1990 (Year 40).

The numbers of houses built each year form an arithmetic sequence with first term a and common difference d .

Given that 2400 new houses were built in 1960 and 600 new houses were built in 1990, find

(a) the value of d ,

(3)

(b) the value of a ,

(2)

(c) the total number of houses built in Oldtown over the 40-year period.

(3)

June 2009

5. A sequence x_1, x_2, x_3, \dots is defined by

$$x_1 = 1,$$

$$x_{n+1} = (x_n)^2 - kx_n, \quad n \geq 1,$$

where k is a constant.

- (a) Find an expression for x_2 in terms of k .

(1)

- (b) Show that $x_3 = 1 - 3k + 2k^2$.

(2)

Given also that $x_3 = 1$,

- (c) calculate the value of k .

(3)

- (d) Hence find the value of $\sum_{n=1}^{100} x_n$.

(3)

May 2013 (R)

6. The equation $kx^2 + 4x + (5 - k) = 0$, where k is a constant, has 2 different real solutions for x .

- (a) Show that k satisfies

$$k^2 - 5k + 4 > 0.$$

(3)

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

(4)

January 2009

7. The point $P(1, a)$ lies on the curve with equation $y = (x + 1)^2(2 - x)$.

(a) Find the value of a .

(1)

(b) Sketch the curves with the following equations:

(i) $y = (x + 1)^2(2 - x)$,

(ii) $y = \frac{2}{x}$.

On your diagram show clearly the coordinates of any points at which the curves meet the axes.

(5)

(c) With reference to your diagram in part (b), state the number of real solutions to the equation

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

(1)

January 2009

8. The curve C has equation $y = kx^3 - x^2 + x - 5$, where k is a constant.

(a) Find $\frac{dy}{dx}$.

(2)

The point A with x -coordinate $-\frac{1}{2}$ lies on C . The tangent to C at A is parallel to the line with equation $2y - 7x + 1 = 0$.

Find

(b) the value of k ,

(4)

(c) the value of the y -coordinate of A .

(2)

June 2008

9. A curve has equation $y = f(x)$. The point P with coordinates $(9, 0)$ lies on the curve.

Given that

$$f'(x) = \frac{x+9}{\sqrt{x}}, \quad x > 0,$$

- (a) find $f(x)$.

(6)

- (b) Find the x -coordinates of the two points on $y = f(x)$ where the gradient of the curve is equal to 10.

(4)

May 2013 (R)

10. The curve C has equation

$$y = 9 - 4x - \frac{8}{x}, \quad x > 0.$$

The point P on C has x -coordinate equal to 2.

- (a) Show that the equation of the tangent to C at the point P is $y = 1 - 2x$.

(6)

- (b) Find an equation of the normal to C at the point P .

(3)

The tangent at P meets the x -axis at A and the normal at P meets the x -axis at B .

- (c) Find the area of the triangle APB .

(4)

January 2009

TOTAL FOR PAPER: 75 MARKS

END