

Bronze Level B4

Question paper

Level	A Level
Exam Board	Edexcel GCE
Subject	Mathematics
Module	Core 1
Difficulty Level	Bronze Level B4
Booklet	Question paper

Time Allowed: 90 minutes

Score: /75

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>71	63	55	47	39	<31

1. Simplify $(3 + \sqrt{5})(3 - \sqrt{5})$.

(2)

May 2007

2. (a) Expand and simplify $(7 + \sqrt{5})(3 - \sqrt{5})$.

(3)

(b) Express $\frac{7 + \sqrt{5}}{3 + \sqrt{5}}$ in the form $a + b\sqrt{5}$, where a and b are integers.

(3)

January 2010

3. Given that $y = 2x^3 + \frac{3}{x^2}$, $x \neq 0$, find

(a) $\frac{dy}{dx}$,

(3)

(b) $\int y \, dx$, simplifying each term.

(3)

June 2009

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

$$x_1 = 1,$$

$$x_{n+1} = ax_n + 5, \quad n \geq 1,$$

where a is a constant.

(a) Write down an expression for x_2 in terms of a .

(1)

(b) Show that $x_3 = a^2 + 5a + 5$.

(2)

Given that $x_3 = 41$

(c) find the possible values of a .

(3)

January 2012

5. (a) Write $\frac{2\sqrt{x+3}}{x}$ in the form $2x^p + 3x^q$, where p and q are constants.

(2)

Given that $y = 5x - 7 + \frac{2\sqrt{x+3}}{x}$, $x > 0$,

- (b) find $\frac{dy}{dx}$, simplifying the coefficient of each term.

(4)

January 2008

6. Given that $\frac{2x^2 - x^{\frac{3}{2}}}{\sqrt{x}}$ can be written in the form $2x^p - x^q$,

- (a) write down the value of p and the value of q .

(2)

Given that $y = 5x^4 - 3 + \frac{2x^2 - x^{\frac{3}{2}}}{\sqrt{x}}$,

- (b) find $\frac{dy}{dx}$, simplifying the coefficient of each term.

(4)

January 2009

7. The curve with equation $y = f(x)$ passes through the point $(-1, 0)$.

Given that

$$f'(x) = 12x^2 - 8x + 1,$$

find $f(x)$.

(5)

January 2011

8. The equation $x^2 + (k - 3)x + (3 - 2k) = 0$, where k is a constant, has two distinct real roots.

- (a) Show that k satisfies

$$k^2 + 2k - 3 > 0.$$

(3)

- (b) Find the set of possible values of k .

(4)

January 2011

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

- (b) Sketch the curve C with equation

$$y = x^3 - 4x,$$

showing the coordinates of the points at which the curve meets the axis.

(3)

The point A with x -coordinate -1 and the point B with x -coordinate 3 lie on the curve C .

- (c) Find an equation of the line which passes through A and B , giving your answer in the form $y = mx + c$, where m and c are constants. (5)

- (d) Show that the length of AB is $k\sqrt{10}$, where k is a constant to be found. (2)

January 2010

10. (a) Factorise completely $x^3 - 6x^2 + 9x$ (3)

- (b) Sketch the curve with equation

$$y = x^3 - 6x^2 + 9x$$

showing the coordinates of the points at which the curve meets the x -axis.

(4)

Using your answer to part (b), or otherwise,

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

$$y = (x - 2)^3 - 6(x - 2)^2 + 9(x - 2)$$

showing the coordinates of the points at which the curve meets the x -axis.

(2)

June 2009

11. The curve C has equation $y = f(x)$, $x > 0$, where

$$\frac{dy}{dx} = 3x - \frac{5}{\sqrt{x}} - 2.$$

Given that the point $P(4, 5)$ lies on C , find

(a) $f(x)$,

(5)

(b) an equation of the tangent to C at the point P , giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.

(4)

May 2010

TOTAL FOR PAPER: 75 MARKS

END