IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper B

Difficulty Rating: 3.0667/1.3636

Time: 1 hour 30 minutes

Calculators may NOT be used in this examination.

Information for Candidates

This practice paper follows the Edexcel Syllabus.
The standard booklet "Mathematical Formulae and Statistical Tables" may be used.
Full marks may be obtained for answers to ALL questions.
The marks for the parts of questions are shown in round brackets, e.g. **(2)**.
There are 11 questions in this question paper.
The total mark for this paper is 75.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the Examiner.
Answers without working may not gain full credit.
The examiner may refuse to mark any parts of questions if deemed not to be legible.

Question 1

$$y = 2x^2 - \frac{6}{x^3} + 8x^3, \ x \neq 0.$$

Find an expression for

$$\int y \, dx. \qquad \textbf{(3)}$$

Question 2

Write each of the following surd expressions as simple as possible.

a) $\left(4 - \sqrt{5}\right)^2$. **(2)**

b) $2\sqrt{5} \times \sqrt{15} - \sqrt{75} - \frac{\sqrt{60}}{\sqrt{5}}$. **(3)**

Question 3

It is given that for all values of x

$$5x^2 + Ax - 7 \equiv B\left(x + 2\right)^2 + C,$$

where A, B and C are constants.

Determine the values of A, B and C. **(3)**

Question 4

Find the range of values of the constant m so that the quadratic equation

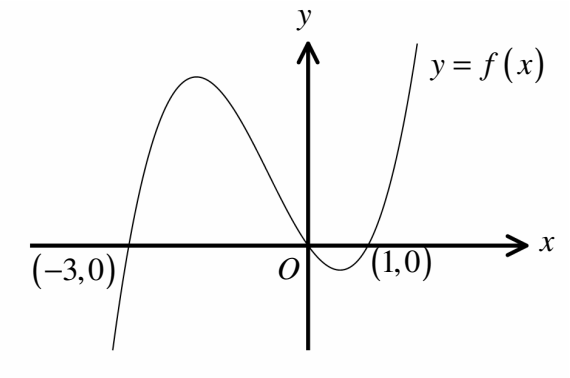
$$x^2+(m+3)x+(3m+4)=0$$

has two distinct real roots. **(6)**

Question 5

The figure below shows the graph of the curve with equation $y=f(x)$.

The curve meets the x axis at $(-3,0)$, at $(1,0)$ and at the origin O.



Sketch on separate diagrams the graph of …

a) … $y=f(x-3)$. **(2)**

b) … $y=f(-x)$. **(2)**

c) … $y=f\left(\frac{1}{3}x\right)$. **(2)**

Each sketch must include the coordinates of any points where the graph meets the coordinate axes.

Question 6

Solve the simultaneous equations

$$\begin{aligned} x+2y&=3 \\ 4y^2-x^2&=33 \end{aligned} \qquad \textbf{(6)}$$

Question 7

The straight line l_1 has equation

$$3x-2y=1.$$

a) Find an equation of the straight line l_2 which is perpendicular to l_1 and passes through the point $A(4,-1)$, giving the answer in the form $ax+by=c$ where a, b and c are integers. **(4)**

The straight line l_1 meets the coordinate axes at the points P and Q.

The point O represents the origin.

b) Show that the area of the triangle OPQ is $\frac{1}{12}$ of a square unit. **(3)**

Question 8

An athlete is training for a long distance race.

He is preparing by running on 16 consecutive days so that his daily running distances form an arithmetic sequence.

The athlete ran for 15 km on the 16^{th} day of his training and the total distance run over the 16 day training period was 288 km.

Find the distance the athlete ran on the 11^{th} day of his training. **(7)**

Question 9

A sequence of numbers is given by the recurrence relation

$$a_{n+1} = 5 - \frac{18}{4 + a_n}, \quad n \geq 1, \quad a_2 = 0.$$

a) Find the values of a_3, a_4 and a_5. **(3)**

b) Determine the value of a_1. **(3)**

c) Calculate the value of

$$\sum_{r=1}^{5} a_r .$$ **(2)**

Question 10

The curve C_1 has equation

$$y = -\frac{2}{x}, \quad x \in \mathbb{R}, \quad x \neq 0.$$

a) Sketch the graph of C_1. **(2)**

The curve C_2 has equation

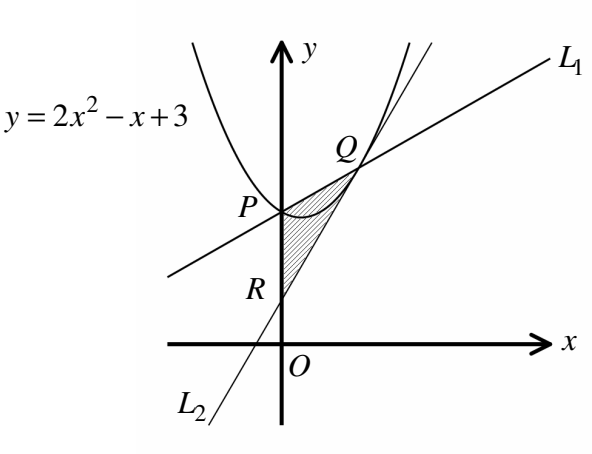
$$y = x^3 - 3x, \quad x \in \mathbb{R}.$$

b) Sketch the graph of C_2.

The sketch must include the coordinates, in exact surd form where appropriate, of all the points where the curve meets the coordinate axes. **(3)**

c) Find the x coordinates of the points of intersection between C_1 and C_2. **(4)**

Question 11



The figure above shows the curve C with equation

$$y = 2x^2 - x + 3.$$

C crosses the y axis at the point P. The normal to C at P is the straight line L_1.

a) Find an equation of L_1. **(5)**

L_1 meets the curve again at the point Q.

b) Determine the coordinates of Q. **(4)**

The tangent to C at Q is the straight line L_2.

L_2 meets the y axis at the point R.

c) Show that the area of the triangle PQR is one square unit. **(6)**