IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper F

Difficulty Rating: 3.2867/1.4742

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 10 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

The point $P(1,3)$ lies on the curve with equation $y = f(x)$, whose gradient function is given by

$$f'(x) = 6x^2 - 4x, \ x \in \mathbb{R}.$$

Find an equation for $f(x)$. **(5)**

Question 2

A rectangular room has an area of $6+3\sqrt{7}$ m^2.

The length of the room is $5+2\sqrt{7}$ m.

Find the width of the room, giving the answer as an exact surd in its simplest form. **(5)**

Question 3

a) Evaluate the following indicial expressions, giving the final answers as exact simplified fractions.

i. $8^{\frac{1}{3}} + 8^{-\frac{1}{3}}$. **(2)**

ii. $8^{-4} \times 2^{11}$. **(2)**

b) Simplify fully

$$\frac{\sqrt{9x^6y^4}}{\left(3x^2y^3\right)^2}.$$ **(3)**

Question 4

The curve C has equation

$$y = x^2 + ax + b,$$

where a and b are non zero constants.

Given that C has a minimum at $(-1, 2)$, determine the value of a and the value of b.

(3)

Question 5

The curve C has equation

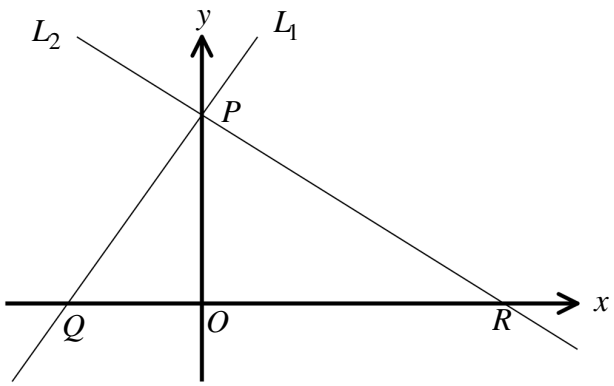
$$y = 6x - 2x^2 - x^3.$$

a) Sketch the graph of C.

The sketch must include the **exact** coordinates of all the points where the curve meets the coordinate axes. **(6)**

b) Determine, as an exact simplified surd, the **greatest** distance between the x intercepts of C. **(1)**

Question 6



The figure above shows the straight line L_1 with equation

$$3x - 2y + 18 = 0 .$$

The straight line L_2 is perpendicular to L_1 and the two lines meet each other at the point $P(0, p)$.

The straight lines L_1 and L_2 cross the x axis at the points Q and R, respectively.

a) Find the value of p. **(2)**

b) Determine an equation for L_2. **(4)**

c) Show that the area of the triangle PQR is 87.75 square units. **(5)**

Question 7

a) Find the sum of the multiples of twelve between 1 and 250. **(5)**

b) Hence, or otherwise, determine the value of

$$\sum_{r=1}^{20} 4(3r+1). \quad \textbf{(3)}$$

Question 8

The quadratic equation

$$3(k+2)x^2-(5k+7)x+3k+1=0,$$

where k is a constant, $k \neq -2$, has two distinct real roots.

Show clearly that

$$-\frac{25}{11} < k < 1. \quad \textbf{(8)}$$

Question 9

A sequence $u_1, u_2, u_3, u_4, \ldots$ is given by

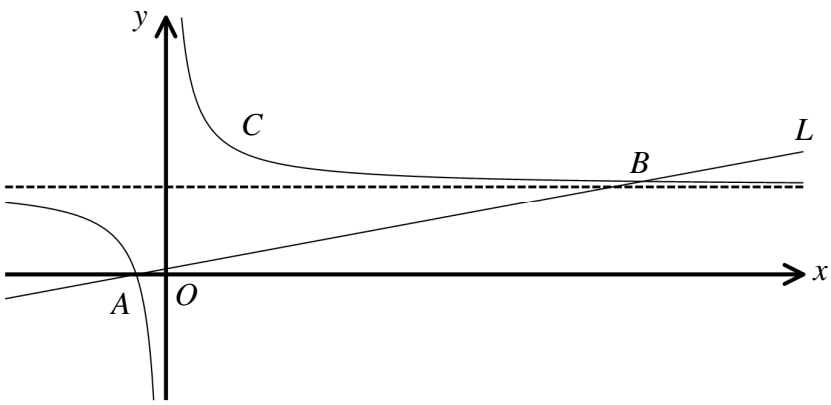
$$u_{n+2} = 4u_{n+1} + ku_n,$$

where k is a non zero constant.

It is further given that $u_2 = 4$, $u_3 = 12$ and $u_5 = 178$.

Determine in any order the value of k and the value of u_4. **(5)**

Question 10



The figure above shows a sketch of the curve C with equation

$$y = 2 + \frac{1}{x},\ x \neq 0.$$

The dotted line represents an asymptote to C and the point A is the point where C crosses the x axis.

a) State the equations of the two asymptotes to the C. **(2)**

b) Find the coordinates of A. **(2)**

The straight line L is the normal to C at A, and B is the point where L meets C again.

c) Show that an equation for L is

$$8y = 2x + 1.$$ **(6)**

d) Determine the coordinates of B. **(6)**