IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper P

Difficulty Rating: 3.2467/1.4528

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

Find the solutions of the equation

$$3x - \frac{5}{x} = 2 . \qquad (4)$$

Question 2

$$\sqrt{3}\left(x - \sqrt{3}\right) = x + \sqrt{3} .$$

Solve the above equation giving the answer in the form $a + b\sqrt{3}$, where a and b are integers. (6)

Question 3

The fifth term and the twentieth term of an arithmetic series are 38 and 158, respectively.

a) Find the first term and the common difference of the series. (5)

b) Determine the sum of the first twenty terms of the series. (2)

Question 4

Solve the simultaneous equations

$$xy = 3$$
$$3x + y = 10 \qquad (6)$$

Question 5

The straight lines with equations

$$y = 3x + c \quad \text{and} \quad y = 2x + 7$$

intersect at the point $P(2, k)$, where c and k are constants.

Find the value of c and the value of k. **(4)**

Question 6

The curves C_1 and C_2 have respective equations

$$C_1: \ y = \frac{1}{x-3}, \ x \neq 3$$

$$C_2: \ y = \frac{1}{x} - 3, \ x \neq 0$$

Sketch on separate diagrams the graph of C_1 and the graph of C_2.

Indicate clearly in each graph any asymptotes and the coordinates of any intersections with the coordinate axes. **(6)**

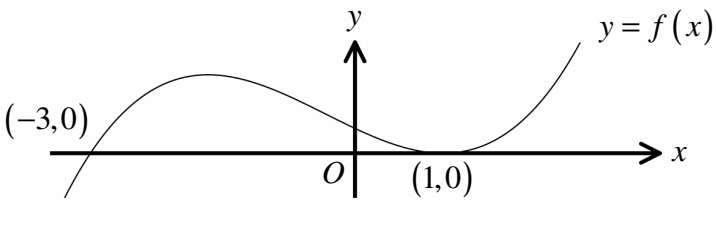
Question 7

$f(x) = m(1-x) - x^2$, where m is a constant.

The equation $f(x) = 0$ has no real roots.

Determine the range of the possible values of m. **(7)**

Question 8



The figure above shows the graph of the curve C with equation

$$f(x) = x^3 + ax^2 + bx + c,$$

where a, b and c are constants.

The curve crosses the x axis at $(-3,0)$ and touches the x axis at $(1,0)$.

a) Find the value of a, b and c. **(3)**

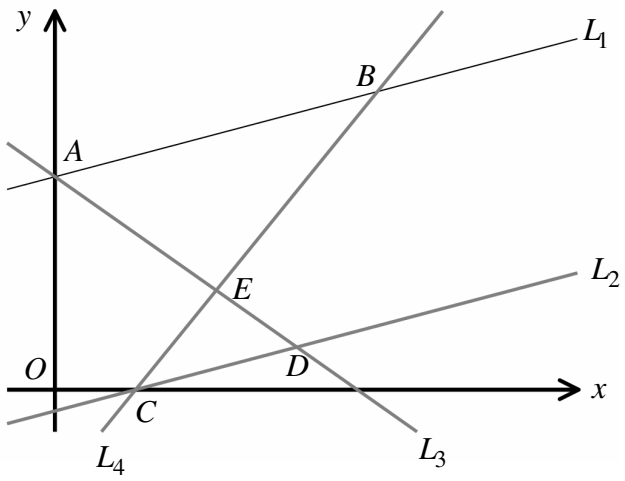
b) Sketch the graph of $y = f\left(\frac{1}{3}x\right)$, clearly marking the coordinates of any points of intersection with the coordinate axes. **(3)**

The graph of C is translated by the vector $\begin{bmatrix} -1 \\ 0 \end{bmatrix}$ to give the graph of $g(x)$.

c) Show clearly that

$$g(x) = x^3 + 4x^2.$$ **(2)**

Question 9



The figure above shows the points $A(0,5)$, $B(4,7)$, $C(1,0)$ and $D(3,1)$.

The straight line L_1 passes through A and B, and the straight line L_2 passes through C and D.

a) Find an equation for L_1. **(3)**

b) Show that L_2 is parallel to L_1. **(2)**

The straight line L_3 passes through A and D, and the straight line L_4 passes through B and C.

The lines L_3 and L_4 intersect at the point E.

c) Determine the ratio of the area of the triangle ABE to that of ECD.
The individual calculations of these areas are not needed for this part. **(4)**

Question 10

The point $P\left(4,\frac{1}{3}\right)$ lies on the curve C whose gradient function is given by

$$\frac{dy}{dx}=\frac{x^{\frac{5}{2}}+24}{x^2},\ x\neq 0.$$

a) Determine an equation of the tangent to C at P. **(3)**

b) Find an equation of C. **(6)**

Question 11

The point $A(p,q)$ lies on the curve with equation

$$y=2x^3-4x^2+2x-1.$$

The tangent to the curve at A has equation

$$x+2y+1=0.$$

Find the coordinates of A. **(9)**
