IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper G

Difficulty Rating: 3.1933/1.4252

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

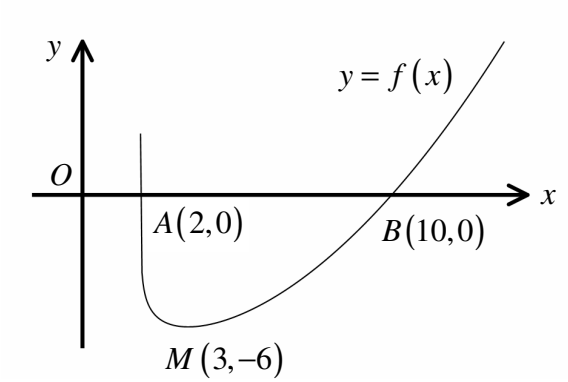
You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the Examiner.
Answers without working may not gain full credit.
The examiner may refuse to mark any parts of questions if deemed not to be legible.

Question 1

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

The curve crosses the x axis at $A(2,0)$ and at the point $B(10,0)$.

The curve has a minimum at $M(3,-6)$.



Sketch on separate diagrams the graph of …

a) … $y = f(2x)$. **(2)**

b) … $y = -f(x)$. **(2)**

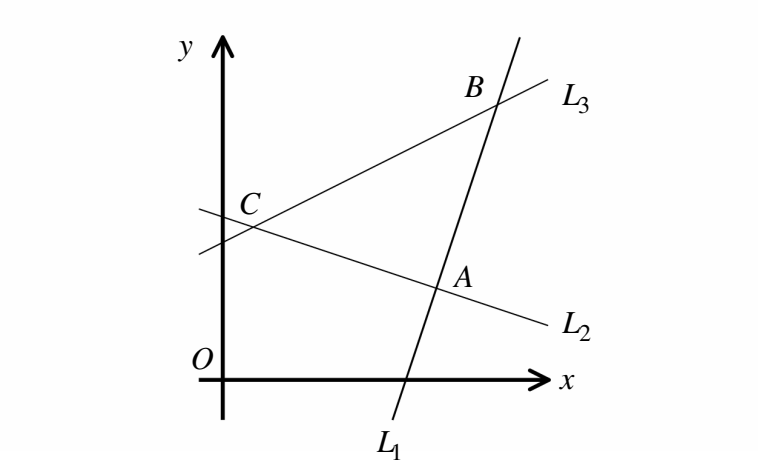
Each sketch must include the coordinates of any points where the graph crosses the x axis and the new coordinates of the minimum point of the curve.

Question 2

$$\frac{98}{\left(3+\sqrt{2}\right)^2}.$$

Write the above surd expression in the form $a + b\sqrt{2}$, where a and b are integers. **(4)**

Question 3



The figure above shows three straight lines L_1, L_2 and L_3.

a) Find an equation of the straight line L_1, given that it passes through the points $A(7,3)$ and $B(9,9)$. **(3)**

L_2 is perpendicular to L_1 and passes through A.

b) Find an equation of L_2. **(2)**

L_3 meets L_1 at the point B and L_2 at the point C.

The equation of L_3 is $y = \frac{x+9}{2}$.

c) Determine the coordinates of C. **(4)**

d) Show that the triangle ABC is isosceles. **(2)**

Question 4

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

i. $2^{-5}-8^{-2}$. **(2)**

ii. $\left(\frac{4}{9}\right)^{\frac{3}{2}}$. **(2)**

b) Solve the equation

$$y^{-\frac{1}{3}}=8. \quad \textbf{(1)}$$

Question 5

$$f(x)=x^2+4x-12,\ x\in\mathbb{R}.$$

a) Solve the equation $f(x)=0$. **(2)**

b) Hence solve the equation **(3)**

$$x^4+4x^2-12=0.$$

Question 6

Use algebra to show

$$\sum_{k=10}^{30}(4k+11) = 1911. \quad \textbf{(6)}$$

Question 7

The cubic equation C passes through the origin O and its gradient function is

$$\frac{dy}{dx} = 6x^2 - 6x - 20 .$$

a) Show clearly that the equation of C can be written as

$$y = x(2x + a)(x + b),$$

where a and b are constants. **(6)**

b) Sketch the graph of C, indicating clearly the coordinates of the points where the graph meets the coordinate axes. **(3)**

Question 8

Solve the simultaneous equations

$$2y + x = 8$$
$$y = 2x^2 - 6x + 7$$ **(6)**

Question 9

$f(x) = x^2 + 2(2p - 1)x + 7p + 4$, where p is a constant

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

Determine the range of values of p. **(7)**

Question 10

The curve C has equation

$$y = 2x^3 - 9x^2 + 12x - 10 .$$

a) Find the coordinates of the two points on C where the gradient is zero. **(5)**

The point P lies on C and its x coordinate is -1.

b) Determine the gradient of C at the point P. **(2)**

The point Q lies on C so the gradient at Q is the same as the gradient at P.

c) Find the coordinates of Q. **(4)**

Question 11

A company arranges to pay a debt of £360,000 by 40 monthly instalments.

These monthly instalments form an arithmetic series.

After 30 of these instalments were paid, the company declared themselves bankrupt leaving one third of their debt unpaid.

Find the value of the first instalment. **(7)**
