IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper C

Difficulty Rating: 3.3267/1.4963

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

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

a) $\sqrt{24.5}-\sqrt{12.5}$. **(3)**

b) $\dfrac{\sqrt{2}}{1+\sqrt{2}}$. **(3)**

Question 2

a) Solve the linear inequality

$$8+3x>4(x-3)+2.$$ **(2)**

b) Solve the quadratic inequality

$$(x-10)(x-4)\geq 5(x-1)-3.$$ **(4)**

c) Hence determine the range of values of x that satisfy both the inequalities of part (a) and part (b). **(2)**

Question 3

The quadratic equation

$$x^2+2mx+3m+4=0,$$

where m is a constant, has equal roots.

Find the possible values of m. **(5)**

Question 4

Solve the simultaneous equations

$$\begin{aligned} x+y&=9 \\ x^2-3xy+2y^2&=0 \end{aligned} \qquad \textbf{(6)}$$

Question 5

$$f(x)=9x^2+18x-7,\ x\in\mathbb{R}.$$

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

b) Express $f(x)$ in the form **(2)**

$$f(x)=9(x+A)^2+B,$$

where A and B are integer constants.

c) State the minimum value of $f(x)$. **(1)**

d) Sketch the graph of $f(x)$, indicating clearly the coordinates of the points where the graph of $f(x)$ meets the coordinate axes. **(3)**

Question 6

The curves C_1 and C_2 have respective equations

$$C_1: \ y = \frac{1}{x} + 2, \ x \neq 0$$

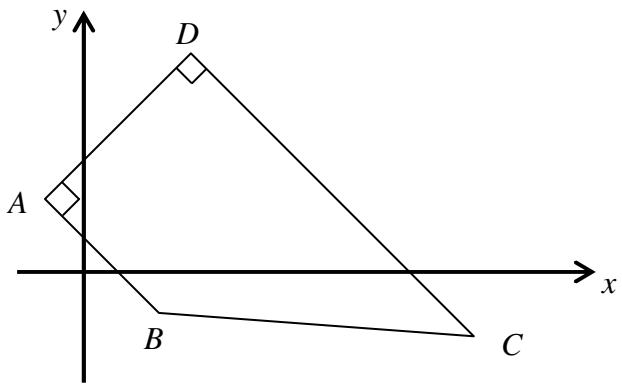
$$C_2: \ y = \frac{1}{x+2}, \ x \neq -2$$

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



The figure above shows a trapezium $ABCD$.

The side AB is parallel to CD and the angles BAD and ADC are both right angles.

The coordinates of D are $(4,7)$, and the straight line through A and B has equation

$$5x+4y=7.$$

a) Show that an equation for the straight line through C and D is

$$5x+4y=48. \qquad (3)$$

b) Find an equation for the straight line through A and D. (3)

The straight line through B and C has equation

$$x+9y+15=0.$$

c) Show that the coordinates of C are $(12,-3)$. (3)

Question 8

A company agrees to pay a loan back in monthly instalments, starting with £1500.

The agreement states that the company will pay back

£$(1500-x)$ in the 2^{nd} month,

£$(1500-2x)$ in the 3^{rd} month,

£$(1500-3x)$ in the 4^{th} month,

and so on, with the repayments decreasing by £x every month.

a) Given that in the first year the company repaid a total of £15360, find the value of x. **(3)**

b) Show that the total money T_n, repaid in n months, is given by

$$T_n = 20n(76-n).$$ **(2)**

The total value of the loan was £26000.

c) Show that the equation

$$T_n = 26000$$

is satisfied by two different values of n. **(3)**

d) Determine, with a valid reason, which of the two values of n represents the actual number of months it takes for the company to repay the loan. **(2)**

Question 9

A curve has equation

$$y = x^3 - 10x + 2,\ x \in \mathbb{R}.$$

The point $P(2,-10)$ lies on the curve.

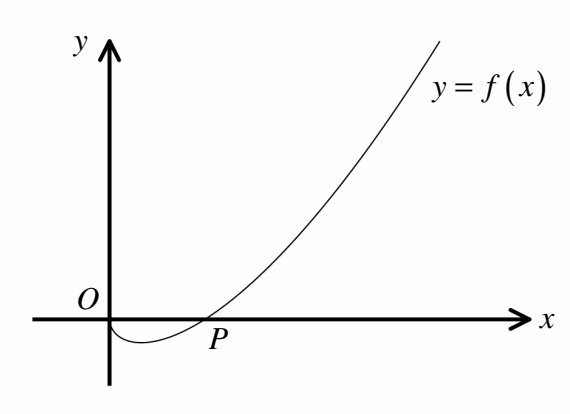
The straight lines l_1 and l_2 are the tangent and the normal to the curve at P, respectively.

a) Find an equation for l_1 and an equation for l_2. **(5)**

l_1 crosses the x axis at A and l_2 crosses the y axis at B.

b) Find the area of the triangle OAB where O is the origin. **(3)**

Question 10



The figure above shows a curve with equation $y = f(x)$ which meets the x axis at the origin O and at the point P.

The gradient function of the curve is given by

$$f'(x) = \frac{12x - 1}{\sqrt{x}},\ x > 0.$$

a) Find an equation of the curve. **(7)**

b) Determine the coordinates of P. **(2)**