IYGB GCE

Core Mathematics C1

Advanced Subsidiary

Practice Paper A

Difficulty Rating: 3.0733/1.3667

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

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

i. $2^{-4}+8^{-1}$. **(2)**

ii. $\left(\frac{81}{16}\right)^{\frac{3}{4}}$. **(2)**

b) Simplify fully the following expression

$$\frac{\left(4xy^2\right)^2}{\left(2x\right)^3}.$$ **(2)**

Question 2

Write each of the following expressions a single simplified surd.

a) $\sqrt{150}-\sqrt{54}$. **(2)**

b) $\frac{21}{\sqrt{7}}$. **(2)**

Question 3

$$f\left(x\right)=x^2-4x-16,\ x\in\mathbb{R}.$$

a) Express $f\left(x\right)$ in the form $\left(x+a\right)^2+b$, where a and b are integers. **(2)**

b) Hence solve the equation $f\left(x\right)=0$, giving the answers as exact surds. **(2)**

Question 4

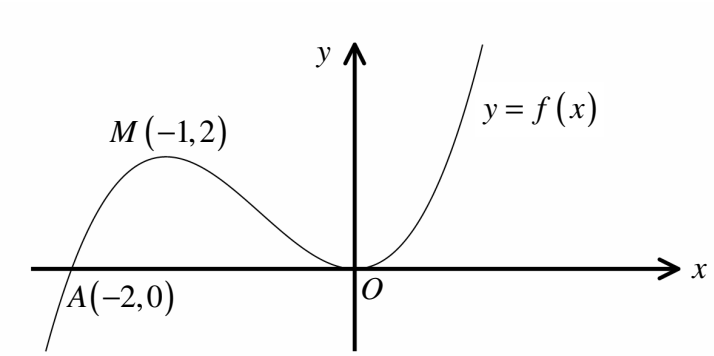
Solve the simultaneous equations

$$5x + y = 7$$
$$3x^2 + y^2 = 21 \qquad (\mathbf{6})$$

Question 5

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

The curve meets the x axis at the origin and at the point $A(-2,0)$ and has a local maximum point at $M(-1,2)$.



Sketch on separate diagrams the graph of …

a) … $y = 2f(x)$. $(\mathbf{2})$

b) … $y = f(x-1)$. $(\mathbf{2})$

c) … $y = f(-x)$ $(\mathbf{2})$

Each sketch must include the coordinates of any points where the graph crosses the coordinate axes and the new coordinates of the maximum point of the curve.

Question 6

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

$$(3p-2)x^2+8x+p=0,\ p\neq\frac{2}{3},$$

has no real roots. **(6)**

Question 7

The curves C_1 and C_2 have respective equations

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

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

(5)

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.

Question 8

The points $A(-1,3)$, $B(3,1)$ and $C(5,5)$ are given.

a) Show that AB is perpendicular to BC. **(3)**

b) Find an equation for the straight line which passes through B and C. **(2)**

The straight line through A and C has equation

$$x-3y+10=0.$$

The midpoint of AB is the point M.

c) Determine an equation of the straight line which passes through M and is parallel to the straight line through A and C. **(4)**

The straight line which passes through M and is parallel to the straight line through A and C, meets BC at the point P.

d) **State** the coordinates of P. **(2)**

Question 9

The first three terms of an arithmetic series are

$$(k-2),\ (2k+5) \text{ and } (4k+1) \text{ respectively,}$$

where k is a constant.

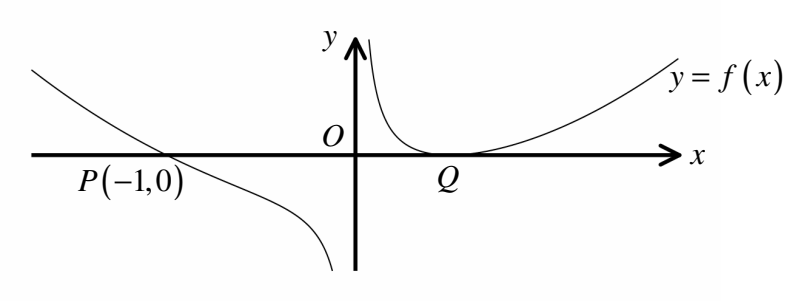
a) Show clearly that $k=11$. **(3)**

b) Find the 41^{st} term of the series. **(3)**

The sum of the first n terms of the series is denoted by S_n.

c) Show that S_n is always a square number. **(3)**

Question 10



The figure above shows a curve with equation $y = f(x)$.

The curve meets the x axis at the points $P(-1,0)$ and Q, and its gradient function is given by

$$f'(x) = \frac{8x^3 - 1}{x^2},\ x \neq 0.$$

a) Find an equation of the tangent to the curve at P. **(3)**

b) Find an expression for $f''(x)$. **(3)**

c) Determine …

i. … an equation of the curve. **(7)**

ii. … the coordinates of Q. **(5)**