IYGB GCE

Core Mathematics C2

Advanced Subsidiary

Practice Paper A

Difficulty Rating: 2.9933/1.3304

Time: 1 hour 30 minutes

Candidates may use any calculator allowed by the Regulations of the Joint Council for Qualifications.

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.
Non exact answers should be given to an appropriate degree of accuracy.
The examiner may refuse to mark any parts of questions if deemed not to be legible.

Question 1

The polynomial $3x^3 - 2x^2 - 12x + 8$ is denoted by $f(x)$.

a) Use the factor theorem to show that $(x+2)$ is a factor of $f(x)$. **(2)**

b) Factorize $f(x)$ fully. **(3)**

Question 2

Expand $(3-2x)^5$ in ascending powers of x, up and including the term in x^3. **(5)**

Question 3

The third and fourth term of a geometric progression are 144 and 108, respectively.

Find …

a) … the common ratio of the progression. **(1)**

b) … the fifth term of the progression. **(2)**

c) … the sum to infinity of the progression. **(3)**

Question 4

$$y = 2x + \frac{8}{x^2},\ x \neq 0.$$

Find the coordinates of the stationary point of y and determine its nature. **(7)**

Question 5

The y values, for the curve with equation $y = \sqrt{x^3 - x}$, have been tabulated below.

x	1	1.5	2	2.5	3	3.5	4
y	0	1.369	2.449	3.623			7.746

a) Complete the table. **(2)**

b) Use the trapezium rule with all the values from the table above to find an estimate, correct to 2 decimal places, for the integral

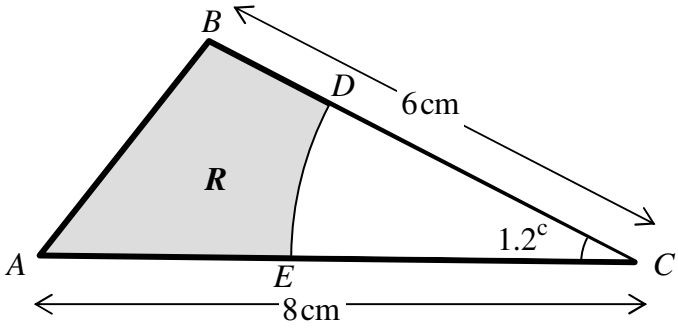
$$\int_1^4 \sqrt{x^3 - x}\ dx\,. \qquad \textbf{(4)}$$

Question 6

Solve the equation

$$\log_5(4 - w) - 2\log_5 w = 1\,. \qquad \textbf{(7)}$$

Question 7



The figure above shows a triangle ABC where the lengths of AC and BC are 8 cm and 6 cm, respectively. The angle BCA is 1.2 radians.

a) Find the length of AB. **(3)**

b) Determine the area of the triangle ABC. **(2)**

A circular arc with centre at C and radius 4 cm is drawn inside the triangle.

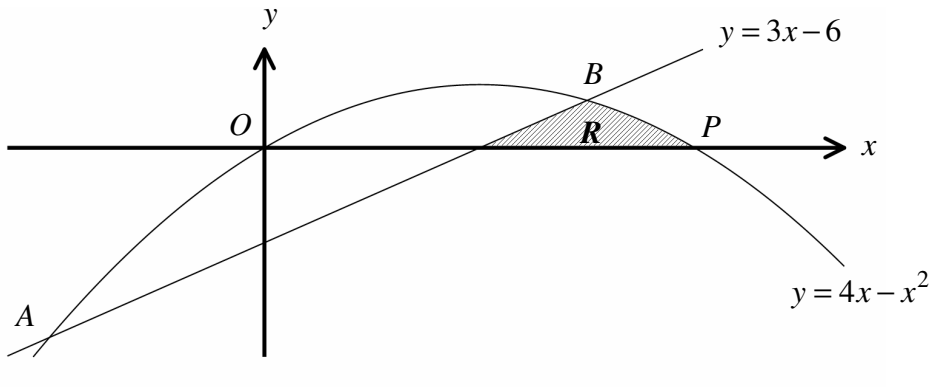
The arc intersects the triangle at the points D and E.

The shaded region R is bounded by the straight lines EA, AB, BD and the arc ED.

c) Calculate the area of R. **(3)**

d) Calculate the perimeter of R. **(2)**

Question 8



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

$$y = 4x - x^2,\ x \in \mathbb{R},$$

intersected by the straight line L with equation

$$y = 3x - 6,\ x \in \mathbb{R}.$$

As shown in the above figure, C meets L at the points A and B, and the x axis at the origin O and at the point P,

The finite region R is bounded by C, L and the x axis.

Show that the area of R, shown shaded in the figure, is $\frac{19}{6}$. **(12)**

Question 9

A circle has equation

$$x^2 + y^2 - 10x - 8y + 21 = 0 .$$

a) Find the coordinates of the centre and the radius of the circle. **(4)**

b) Determine mathematically, but without solving any equations, whether the circle crosses the coordinate axes. **(2)**

c) Show that the straight line with equation

$$y = 2x + 4$$

is a tangent to the circle, and determine the coordinates of the point where the tangent meets the circle. **(5)**

Question 10

Solve the following trigonometric equation, in the range given.

$$\sqrt{3} + 2\sin\left(3x + \frac{\pi}{4}\right) = 0 , \quad 0 \le x < \frac{\pi}{2} .$$

Give the answers in terms of π. **(7)**