IYGB GCE

Core Mathematics C2

Advanced Subsidiary

Practice Paper N

Difficulty Rating: 3.2333/1.4458

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

a) Find, in ascending powers of x, the first four terms in the binomial expansion of $(2+x)^9$. **(4)**

b) By using the answer of part (a), or otherwise, find the first four terms in the binomial expansion of $\left(2-\frac{1}{4}x\right)^9$. **(2)**

Question 2

$$f(x) \equiv 6x^2 + x + 7, \ x \in \mathbb{R}.$$

The remainder when $f(x)$ is divided by $(x-a)$ is the same as that when $f(x)$ is divided by $(x+2a)$, where a is a non zero constant.

Find the value of a. **(5)**

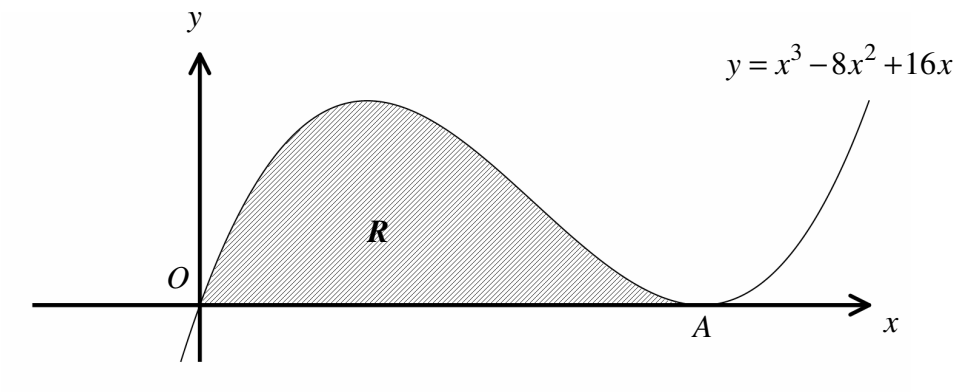
Question 3

A curve C has equation

$$y = x^3 - 3x^2 - 24x - 1, \ x \in \mathbb{R}.$$

Find the range of values of x, for which y is increasing. **(6)**

Question 4



The figure above shows the cubic curve with equation

$$y = x^3 - 8x^2 + 16x,\ x \in \mathbb{R}.$$

The curve meets the x axis at the origin O and at the point A.

a) Show clearly that $x = 4$ at A. **(3)**

The finite region R is bounded by the curve and the x axis.

b) Find the exact area of R. **(5)**

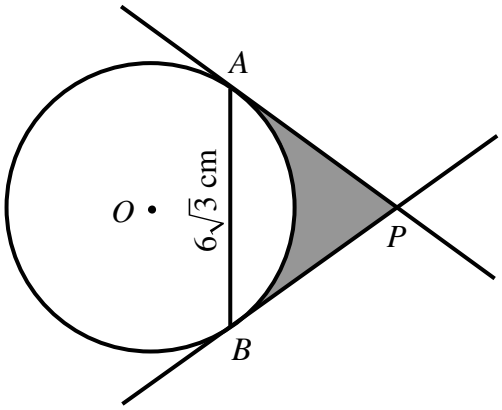
Question 5

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

a) Find the coordinates of the stationary point of y and determine its nature. **(6)**

b) Show clearly that y has no points of inflection. **(2)**

Question 6



not drawn accurately

The figure above shows a circle with centre at O and radius 6 cm.

The chord AB has length $6\sqrt{3}$ cm.

a) Show that the angle AOB is $\frac{2\pi}{3}$ radians. **(3)**

The tangents to the circle at A and B meet at the point P.

b) Show further that the area of the quadrilateral $OAPB$ is $36\sqrt{3}$ cm^2. **(5)**

c) Find the area of the shaded region bounded by the tangents and the circle. **(3)**

Question 7

Solve the following trigonometric equation in the range given.

$$6\cos\psi = 5\tan\psi,\ 0 \le \psi < 2\pi.$$

Give the answers in radians, correct to two decimal places. **(8)**

Question 8

Solve the following exponential equation, giving the answer correct to 3 s.f.

$$4^y - 3\left(2^y\right) - 10 = 0 . \qquad (\mathbf{6})$$

Question 9

A circle C_1 has equation

$$x^2 + y^2 - 10x - 10y + 41 = 0 .$$

a) Determine the coordinates of the centre of C_1 and the size of its radius. $(\mathbf{3})$

Another circle C_2 is such so that C_2 is **touching both** C_1 and the y axis.

b) Find the two possible equations of C_2, given further that the centres of both C_1 and C_2, have the same y coordinate. $(\mathbf{4})$

Question 10

The eighth term of a geometric progression is ten times as large as its fourth term.

The common ratio of the progression is positive.

a) Show that the common ratio of the series is approximately 1.778. **(3)**

The sum of the first eight terms of a **different** geometric progression is ten times as large as the sum of its first four terms.

The common ratio of the progression r, is positive.

b) Show that r is a solution of the equation

$$r^8 - 10r^4 + 9 = 0.$$ **(3)**

c) By reducing the above equation to a suitable quadratic, or otherwise, show that

$$r = \sqrt{3}$$ **(4)**
