IYGB GCE

Core Mathematics C2

Advanced Subsidiary

Practice Paper G

Difficulty Rating: 3.5933/1.6620

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 9 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

Solve the following trigonometric equation in the range given.

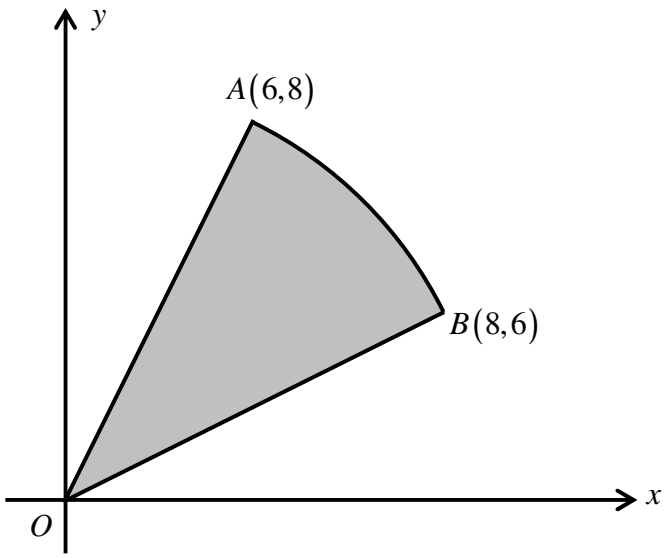
$$\cos(2\theta + 25)° = -0.454, \quad 0 \le \theta < 360. \qquad (\mathbf{6})$$

Question 2

$$I = \int_1^3 \left(\sqrt{x} - \log_{10} x\right)^2 \, dx.$$

Use the trapezium rule with 5 equally spaced strips to find an estimate for I. $(\mathbf{6})$

Question 3



The figure above shows a circular sector OAB with centre at the origin O.

The points A and B have coordinates $(6,8)$ and $(8,6)$, respectively.

a) Show that the angle AOB is approximately 0.2838 radians. $(\mathbf{4})$

b) Find, to 2 decimal places, the area of the sector OAB. $(\mathbf{3})$

Question 4

Given that

$$p = \log_a 4 \quad \text{and} \quad q = \log_a 5,$$

express each of the following logarithms in terms of p and q.

a) $\log_a 100$ (3)

b) $\log_a 0.4$ (3)

Question 5

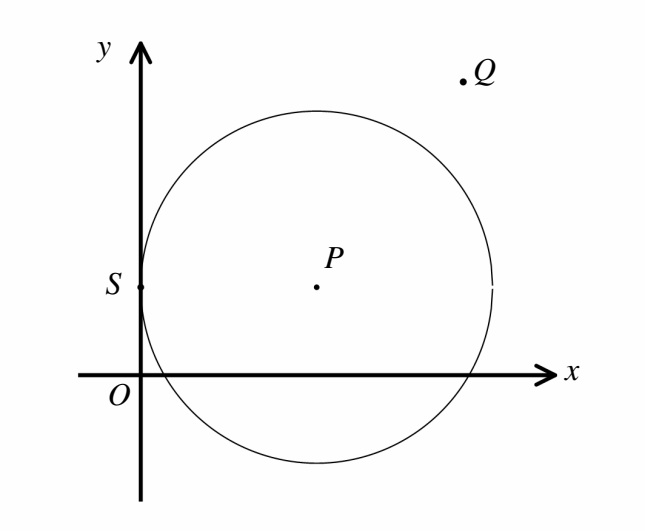
It is given that

$$(1-2x)(2+kx)^5 \equiv A + Bx + 240x^2 + \ldots,$$

where k, A and B are constants.

Determine the possible values of k (8)

Question 6



The figure above shows a circle with centre at P and radius of 6 units.

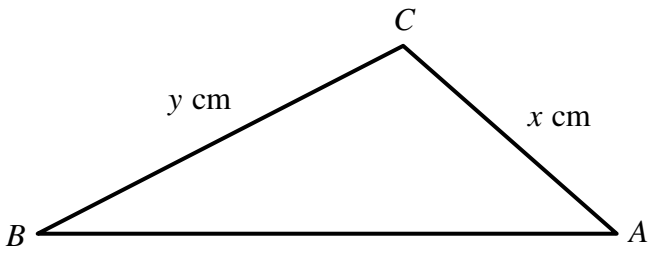
The y axis is a tangent to the circle at the point $S(0,3)$.

a) Find an equation for the circle. **(3)**

A tangent to the circle is drawn from the point $Q(12,10)$ and meets the circle at the point R.

b) Determine the length of QR. **(4)**

Question 7



The figure above shows a triangle ABC.

The lengths of BC and CA are x cm and y cm, respectively.

It is further given that

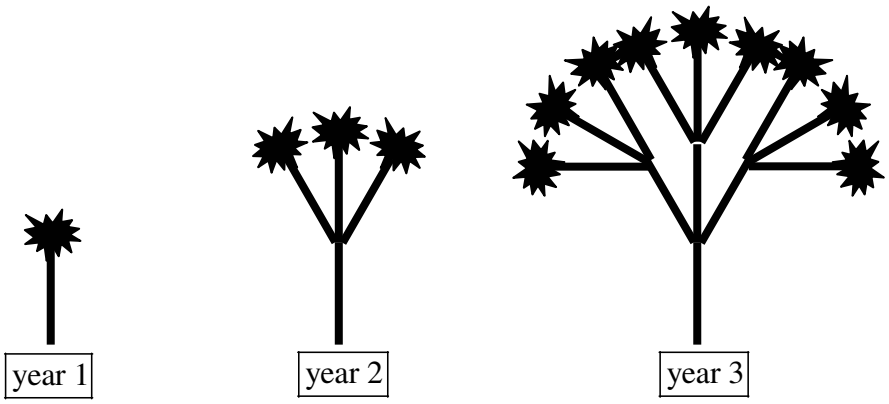
$$\sin A = \frac{4}{5}, \quad \sin B = \frac{8}{17} \quad \text{and} \quad \sin C = \frac{84}{85}.$$

a) Show clearly that $y = 1.7x$. **(4)**

The area of the triangle ABC is 21 cm^2.

b) Find the value of x and the value of y. **(5)**

Question 8



The figure above shows a flowering plant. In year 1 it produces a single stem with a flower at the end.

In year 2, the flower withers and in its place three more stems are produced, with each new stem having a new flower at its end, i.e. 4 stems in total.

In year 3, the flowers wither again and in each of their places a new stems is produced, with each new stem having a new flower at its end, i.e. 13 stems in total.

This flowering pattern continues every year.

a) Find an expression, in terms of n, for …

i. … the number of flowers in the n^{th} year. **(2)**

ii. … the number of stems in the n^{th} year. **(3)**

One such plant has 1093 stems.

b) Determine the number of flowers of this plant. **(3)**

A different plant of the above variety has over 750 flowers.

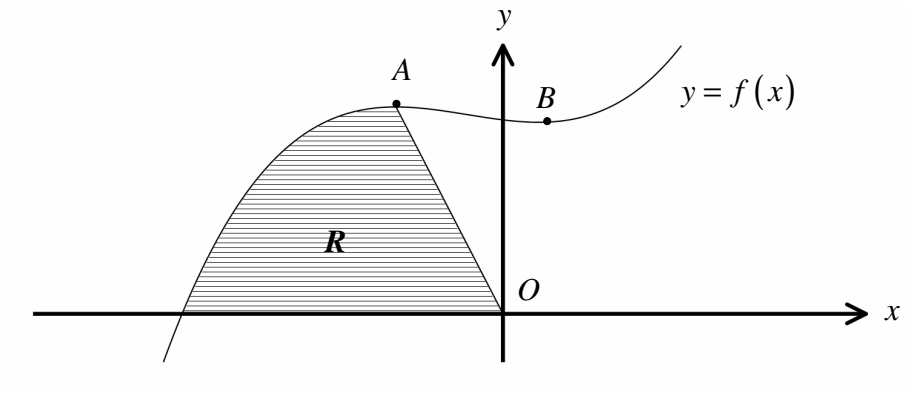
c) Determine the **least** number of stems of this plant. **(3)**

Question 9

$$f(x) = x^3 + x^2 - x + 15,\ x \in \mathbb{R}$$

a) Show that $(x+3)$ is a factor of $f(x)$. **(2)**

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



The points A and B are stationary points of C.

b) Find the exact coordinates of A and B. **(5)**

The finite region R is bounded by the curve, the x axis and the straight line segment OA, where O is the origin.

c) Determine the exact area R. **(8)**