IYGB GCE

Core Mathematics C2

Advanced Subsidiary

Practice Paper L

Difficulty Rating: 3.6200/1.6807

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

Find the first three terms in the expansion of $(2-5x)^5$, in ascending powers of x. **(3)**

Question 2

A circle has its centre at the point $C(-2,3)$ and passes through the point $P(-3,8)$.

a) Find an equation for this circle. **(4)**

b) Show that an equation of the tangent to the circle at P is

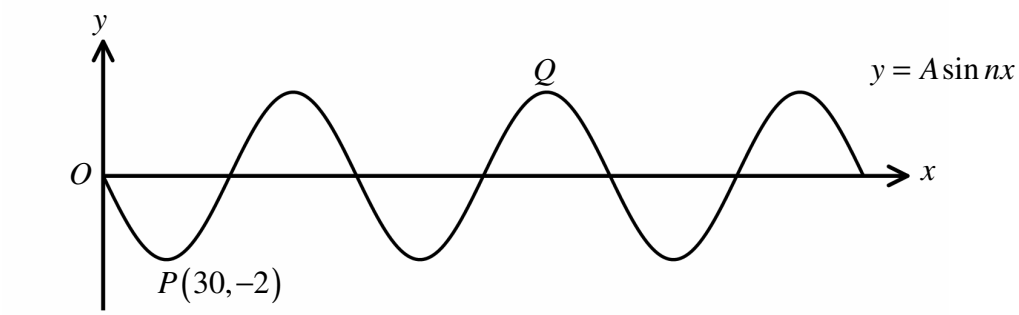
$$x-5y+43=0.$$ **(4)**

Question 3

Solve the following logarithmic equation

$$\log_5(4t+7)-\log_5 t=2.$$ **(4)**

Question 4



The figure above shows part of the graph of

$$y = A\sin nx,$$

where x is measured in degrees and A and n are constants.

The first minimum of the curve for which $x > 0$ is the point $P(30,-2)$.

a) Find the value of A and the value of n. **(2)**

The **second** maximum of the curve for which $x > 0$ is at the point Q.

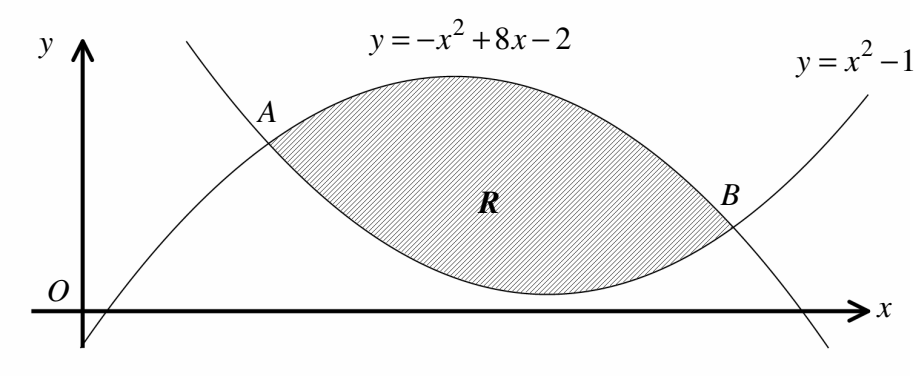
b) Determine the coordinates of Q. **(2)**

Question 5

Four brothers shared £1800 so that their shares formed the terms of a geometric progression.

Given that the largest share was 8 times as large as the smallest share, determine the individual amounts each brother got. **(6)**

Question 6



The figure above shows the graphs of the curves with equations

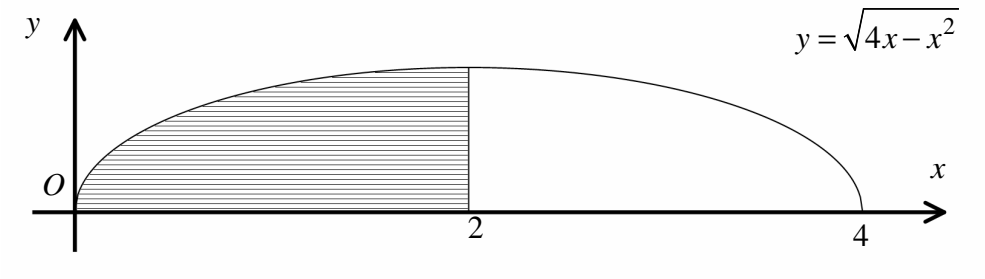
$$y = -x^2 + 8x - 2 \quad \text{and} \quad y = x^2 - 10x + 26 .$$

The two curves intersect each other at the points A and B.

The finite region R bounded by the two curves is shown shaded in the figure above.

Show that the area of R is exactly $\frac{125}{3}$. **(11)**

Question 7



The figure above shows part of the curve C with equation

$$y = \sqrt{4x - x^2} \ .$$

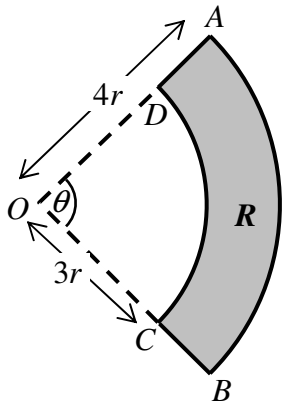
a) Use the trapezium rule with 5 equally spaced trapeziums to estimate, to three significant figures, the area bounded by C, the x axis and the vertical straight line with equation $x = 2$. **(5)**

b) Hence find an estimate for

$$\int_0^2 3 + \sqrt{4x - x^2} \ dx \ . \qquad \textbf{(2)}$$

c) State with justification whether the answer of part (a) will increase or decrease if more than 5 trapeziums are used. **(1)**

Question 8



The figure above shows a circular sector OAB of radius $4r$ subtending an angle θ radians at the centre O. Another circular sector OCD of radius $3r$ also subtending an angle θ radians at the centre O is removed from the first sector leaving the shaded region R.

It is given that R has an area of 50 square units.

a) Show that the perimeter P, of the region R, is given by

$$P = 2r + \frac{100}{r}. \qquad (\mathbf{4})$$

b) Given that the value of r can vary, …

i. … find an exact value of r for which P is stationary. $(\mathbf{4})$

ii. … show clearly that the value of r found above gives the minimum value for P. $(\mathbf{2})$

c) Calculate the minimum value of P. $(\mathbf{2})$

Question 9

Solve the following trigonometric equation in the range given.

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

Give the answers in terms of π. **(8)**

Question 10

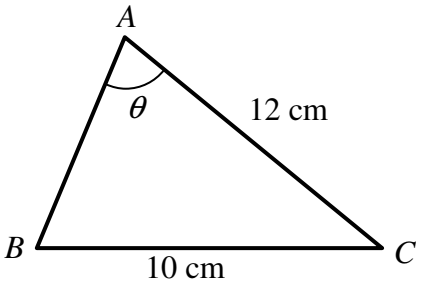


figure 1

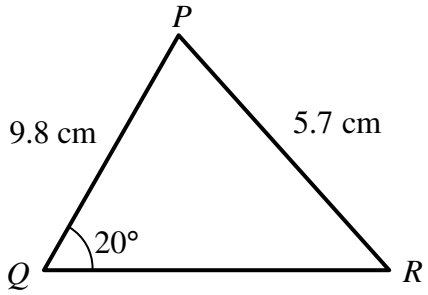


figure 2

Figure 1 shows the triangle ABC, where $|AC|=12$ cm, $|BC|=10$ cm and $\measuredangle BAC=\theta$ so that $\cos\theta=\frac{5}{9}$.

a) Use the cosine rule to form a suitable quadratic, and hence show that one of the **two** possible values for the length of AB is 6 cm and find the other. **(6)**

Figure 2 shows a different triangle PQR, where $|PQ|=9.8$ cm, $|PR|=5.7$ cm and $\measuredangle PQR=20°$.

b) Use the sine rule to find, to the nearest degree, the **two** possible values of $\measuredangle QPR$. **(5)**
