IYGB GCE

Core Mathematics C2

Advanced Subsidiary

Practice Paper B

Difficulty Rating: 2.7200/1.2195

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 binomial expansion of $(1-5x)^4$ in ascending powers of x. **(4)**

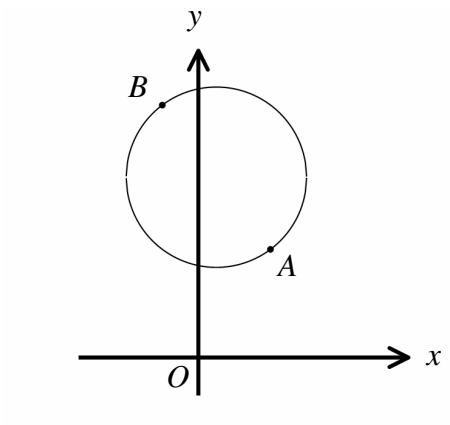
Question 2

The polynomial x^3+4x^2+7x+k, where k is a constant, is denoted by $f(x)$.

a) Given that $(x+2)$ is a factor of $f(x)$, show that $k=6$. **(2)**

b) Express $f(x)$ as a product of a linear factor and a quadratic factor. **(2)**

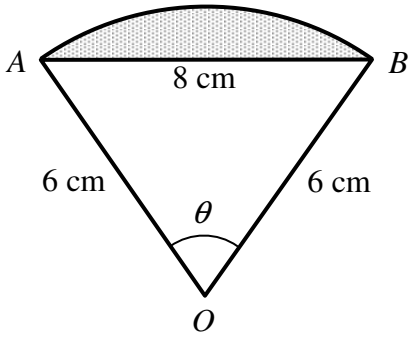
Question 3



The figure above shows the points $A(4,6)$ and $B(-2,14)$, which both lie on the circumference of a circle.

Given that AB is a diameter of the circle, determine an equation for the circle. **(6)**

Question 4



The figure above shows a circular sector OAB, subtending an angle of θ radians at its centre O.

The radius of the sector is 6 cm and the length of the **chord** AB is 8 cm.

a) Find the size of the angle θ in radians, correct to two decimal places. **(3)**

b) Determine the area of the circular **segment**, shown shaded in the figure. **(5)**

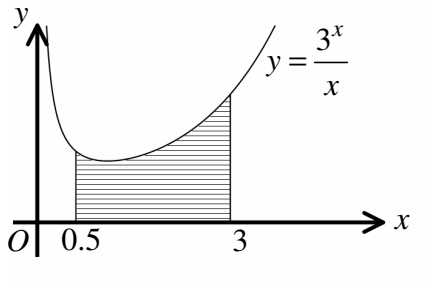
Question 5

The third and the sixth term of a geometric series are 54 and 1458, respectively.

a) Find the first term and the common ratio of the series. **(4)**

b) Determine the sum of the first ten terms of the series. **(2)**

Question 6



The figure above shows part of the curve C with equation

$$y = \frac{3^x}{x},\ x \neq 0.$$

a) Use the trapezium rule with 5 equally spaced strips to estimate, correct to 3 significant figures, the area bounded by C, the x axis and the straight lines with equations $x = 0.5$ and $x = 3$. **(5)**

b) State how the accuracy of the estimate obtained in part (a) can be improved. **(1)**

c) Explain with the aid of a diagram whether the estimate obtained in part (a) is an underestimate or an overestimate for the actual value for this area. **(1)**

Question 7

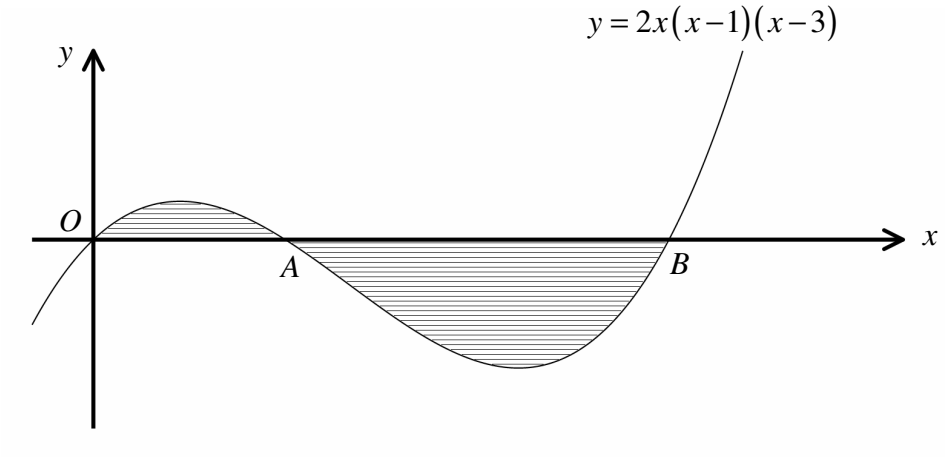
An exponential curve C has equation

$$y = \frac{1}{3^x},\ x \in \mathbb{R}.$$

a) Sketch the graph of C. **(2)**

b) Solve the equation $y = \frac{2}{3}$, giving the answer correct to 3 significant figures. **(3)**

Question 8



The figure above shows part of the curve with equation

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

The curve meets the x axis at the origin and at the points A and B.

Determine the exact area of the finite region bounded by the curve and the x axis, shown shaded in the figure above. **(8)**

Question 9

Solve each of the following trigonometric equations, in the range given.

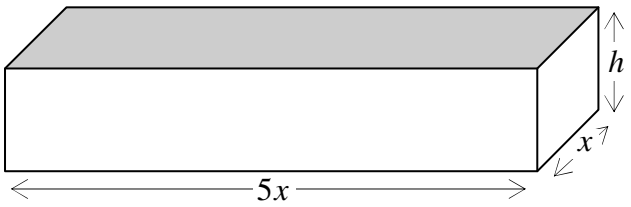
a) $\sin(2\theta + 30°) = \frac{\sqrt{3}}{2},\quad -180° \leq \theta < 180°$ **(6)**

b) $\sin x = 2\cos x,\ \ 0 \leq x < 360°$ **(3)**

c) $2\sin^2 y - 5\cos y + 1 = 0,\ 0 \leq y < 2\pi$ **(6)**

Question 10

The figure below shows a solid brick, in the shape of a cuboid, measuring $5x$ cm by x cm by h cm.



The total surface area of the brick is 720 cm^2.

a) Show that the volume of the brick, V cm^3, is given by

$$V = 300x - \frac{25}{6}x^3 .$$

(4)

b) Find the value of x for which V is stationary. **(4)**

c) Calculate the maximum value for V, fully justifying the fact that it is indeed the maximum value for V. **(4)**