Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C2

Advanced Subsidiary

Set B: Practice Question Paper 6

Time: 1 hour 30 minutes

Materials required for examination	**Items included with question papers**
Mathematical Formulae	Nil

Instructions to Candidates

When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
This paper has 9 questions.

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 gain no credit.

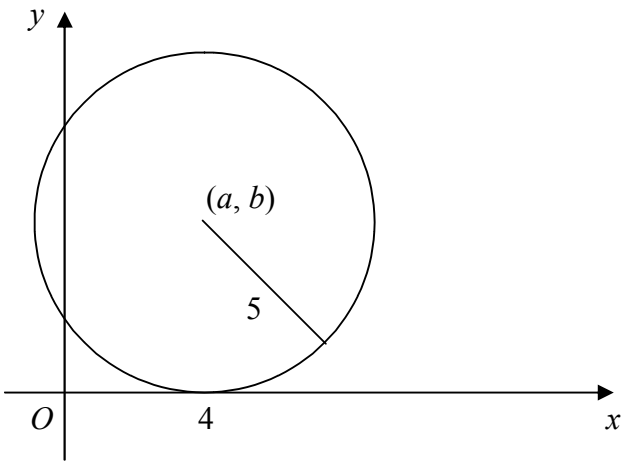
Edexcel
Success through qualifications

1. The point A has coordinates (2, 5) and the point B has coordinates (–2, 8). Find, in cartesian form, an equation of the circle with diameter AB. **(4)**

[P3 January 2004 Question 1]

---

2. **Figure 1**



The circle C, with centre (a, b) and radius 5, touches the x-axis at (4, 0), as shown in Fig. 1.

(a) Write down the value of a and the value of b. **(1)**

(b) Find a cartesian equation of C. **(2)**

A tangent to the circle, drawn from the point $P(8, 17)$, touches the circle at T.

(c) Find, to 3 significant figures, the length of PT. **(3)**

[P3 January 2003 Question 2]

---

3. $\mathrm{f}(n) = n^3 + pn^2 + 11n + 9$, where p is a constant.

(a) Given that $\mathrm{f}(n)$ has a remainder of 3 when it is divided by $(n + 2)$, prove that $p = 6$. **(2)**

(b) Show that $\mathrm{f}(n)$ can be written in the form $(n + 2)(n + q)(n + r) + 3$, where q and r are integers to be found. **(3)**

(c) Hence show that $\mathrm{f}(n)$ is divisible by 3 for all positive integer values of n. **(2)**

[P3 January 2003 Question 3]

---

4. (a) Sketch, for $0 \leq x \leq 360°$, the graph of $y = \sin(x + 30°)$. **(2)**

(b) Write down the coordinates of the points at which the graph meets the axes. **(3)**

(c) Solve, for $0 \leq x < 360°$, the equation $\sin(x + 30°) = -\frac{1}{2}$. **(3)**

[P1 January 2003 Question 2]

---

5. The expansion of $(2 - px)^6$ in ascending powers of x, as far as the term in x^2, is

$$64 + Ax + 135x^2.$$

Given that $p > 0$, find the value of p and the value of A. **(7)**

[P2 June 2003 Question 3]

---

6. Find, in degrees, the value of θ in the interval $0 \leq \theta < 360°$ for which

$$2\cos^2\theta - \cos\theta - 1 = \sin^2\theta.$$

Give your answers to 1 decimal place where appropriate. **(8)**

[P1 June 2003 Question 5]

---

7. **Figure 2**

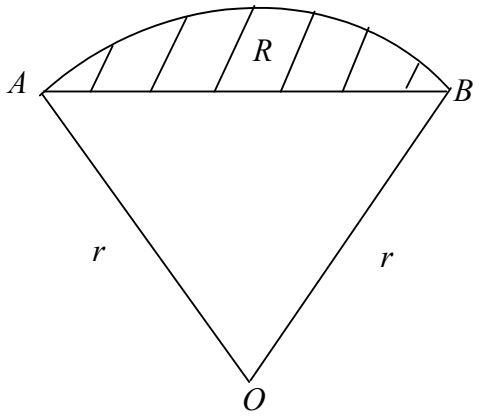


Fig. 2 shows the sector OAB of a circle of radius r cm. The area of the sector is 15 cm^2 and $\angle AOB = 1.5$ radians.

(a) Prove that $r = 2\sqrt{5}$. **(3)**

(b) Find, in cm, the perimeter of the sector OAB. **(2)**

The segment R, shaded in Fig 1, is enclosed by the arc AB and the straight line AB.

(c) Calculate, to 3 decimal places, the area of R. **(3)**

[P1 June 2003 Question 4]

---

8. **Figure 3**

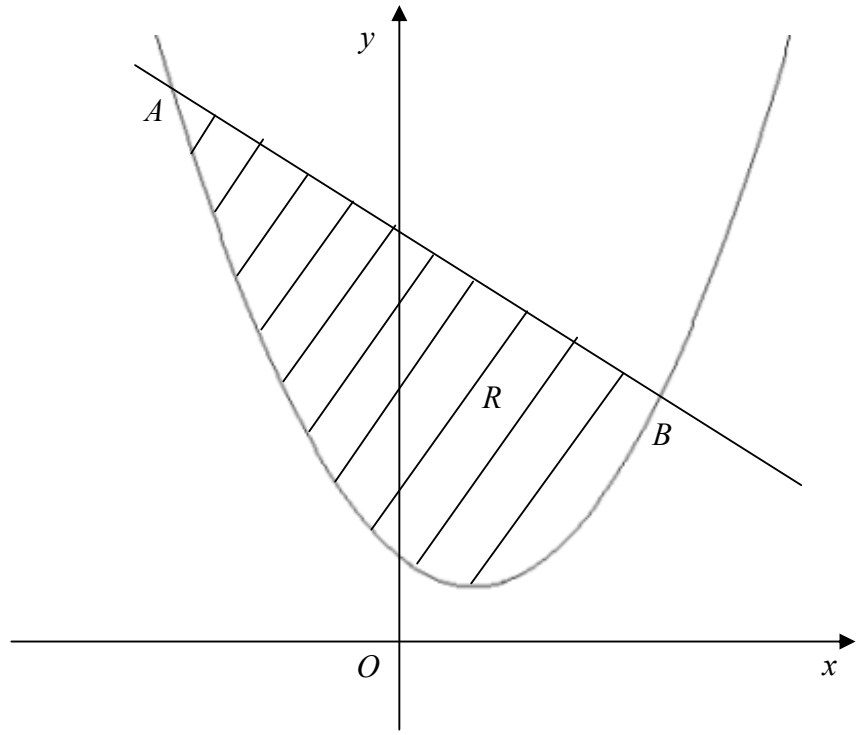


Fig. 3 shows the line with equation $y = 9 - x$ and the curve with equation $y = x^2 - 2x + 3$. The line and the curve intersect at the points A and B, and O is the origin.

(a) Calculate the coordinates of A and the coordinates of B. **(5)**

The shaded region R is bounded by the line and the curve.

(b) Calculate the area of R. **(7)**

[P1 June 2003 Question 7]

---

9. For the curve C with equation $y = x^4 - 8x^2 + 3$,

(a) find $\frac{dy}{dx}$, **(2)**

(b) find the coordinates of each of the stationary points, **(5)**

(c) determine the nature of each stationary point. **(3)**

The point A, on the curve C, has x-coordinate 1.

(d) Find an equation for the normal to C at A, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers. **(5)**

[P1 June 2003 Question 8]
