

Edexcel GCE
Core Mathematics C2
Practice Paper A2
(Question Paper)

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1.

$$f(x) = px^3 + 6x^2 + 12x + q.$$

Given that the remainder when $f(x)$ is divided by $(x - 1)$ is equal to the remainder when $f(x)$ is divided by $(2x + 1)$,

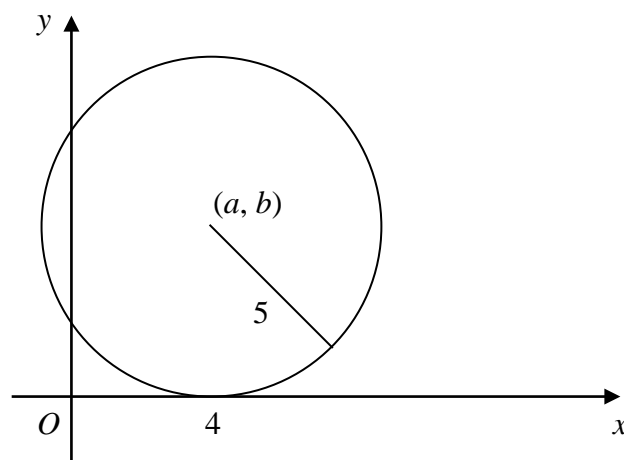
(a) find the value of p . (4 marks)

Given also that $q = 3$, and p has the value found in part (a),

(b) find the value of the remainder. (1 marks)

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 marks)

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

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 marks)

3. (a) Expand $(2\sqrt{x} + 3)^2$. (2 marks)

(b) Hence evaluate $\int_1^2 (2\sqrt{x} + 3)^2 dx$, giving your answer in the form $a + b\sqrt{2}$, where a and b are integers. (5 marks)

4. The first three terms in the expansion, in ascending powers of x , of $(1 + px)^n$, are $1 - 18x + 36p^2x^2$. Given that n is a positive integer, find the value of n and the value of p . (7 marks)
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5. Find all values of θ in the interval $0 \leq \theta < 360$ for which
- (a) $\cos(\theta + 75)^\circ = 0$. (3 marks)
- (b) $\sin 2\theta^\circ = 0.7$, giving your answers to one decimal place. (5 marks)
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6. Given that $\log_2 x = a$, find, in terms of a , the simplest form of
- (a) $\log_2(16x)$, (2 marks)
- (b) $\log_2\left(\frac{x^4}{2}\right)$. (3 marks)
- (c) Hence, or otherwise, solve

$$\log_2(16x) - \log_2\left(\frac{x^4}{2}\right) = \frac{1}{2},$$

giving your answer in its simplest surd form. (4 marks)

7. The curve C has equation $y = \cos\left(x + \frac{\pi}{4}\right)$, $0 \leq x \leq 2\pi$.
- (a) Sketch C . (2 marks)
- (b) Write down the exact coordinates of the points at which C meets the coordinate axes. (3 marks)
- (c) Solve, for x in the interval $0 \leq x \leq 2\pi$,

$$\cos\left(x + \frac{\pi}{4}\right) = 0.5,$$

giving your answers in terms of π . (4 marks)

8.

Figure 2

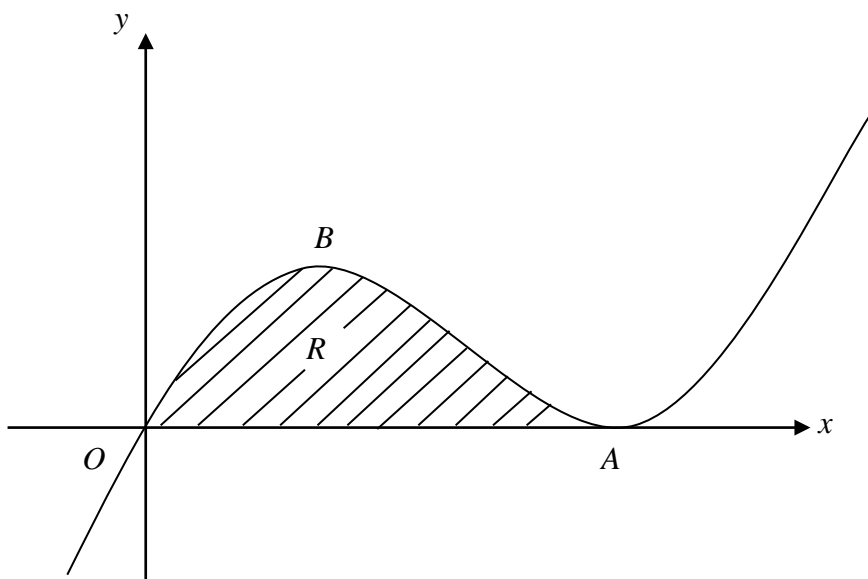


Figure 2 shows part of the curve with equation

$$y = x^3 - 6x^2 + 9x.$$

The curve touches the x -axis at A and has a maximum turning point at B .

(a) Show that the equation of the curve may be written as

$$y = x(x - 3)^2,$$

and hence write down the coordinates of A .

(2 marks)

(b) Find the coordinates of B .

(5 marks)

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

(c) Find the area of R .

(5 marks)

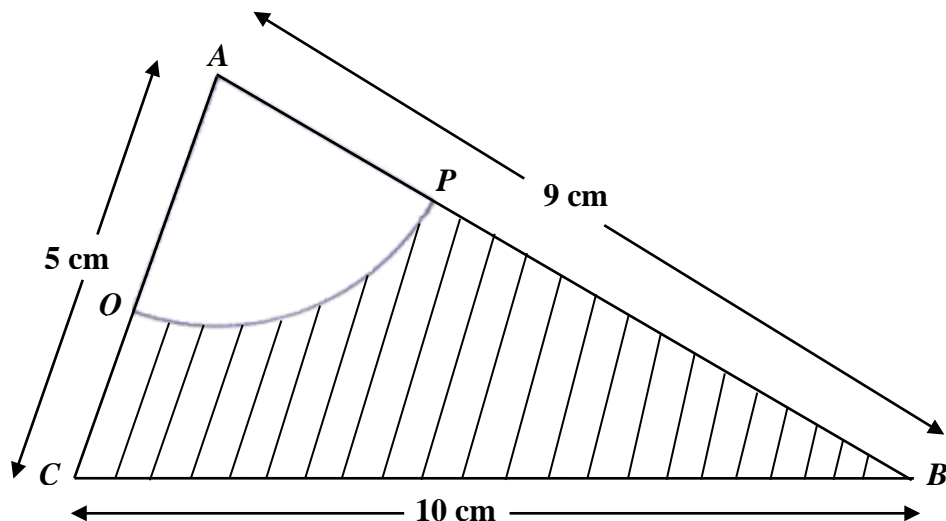


Fig. 3

Triangle ABC has $AB = 9\text{ cm}$, $BC = 10\text{ cm}$ and $CA = 5\text{ cm}$.

A circle, centre A and radius 3 cm , intersects AB and AC at P and Q respectively, as shown in Fig. 3.

(a) Show that, to 3 decimal places, $\angle BAC = 1.504$ radians. (3 marks)

Calculate,

(b) the area, in cm^2 , of the sector APQ , (2 marks)

(c) the area, in cm^2 , of the shaded region $BPQC$, (3 marks)

(d) the perimeter, in cm , of the shaded region $BPQC$. (4 marks)

END