FOR EDEXCEL

## GCE Examinations Advanced Subsidiary

## **Core Mathematics C2**

Paper G

Time: 1 hour 30 minutes

## Instructions and Information

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration.

Full marks may be obtained for answers to ALL questions.

Mathematical formulae and statistical tables are available.

This paper has nine questions.

## Advice to Candidates

You must show sufficient working to make your methods clear to an examiner. Answers without working may gain no credit.



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	HVO	lmate

$$\int_{-2}^{0} (3x - 1)^2 dx.$$
 (5)

2.  $f(x) = x^3 + kx - 20.$ 

Given that f(x) is exactly divisible by (x + 1),

- (a) find the value of the constant k, (2)
- (b) solve the equation f(x) = 0. (4)
- **3.** (a) Given that

$$5\cos\theta - 2\sin\theta = 0$$
,

show that  $\tan \theta = 2.5$  (2)

**(4)** 

(b) Solve, for  $0 \le x \le 180$ , the equation

$$5\cos 2x^{\circ} - 2\sin 2x^{\circ} = 0,$$

giving your answers to 1 decimal place.

**4.** Solve each equation, giving your answers to an appropriate degree of accuracy.

(a) 
$$3^{x-2} = 5$$

(b) 
$$\log_2(6-y) = 3 - \log_2 y$$
 (4)

**5.** A geometric series has third term 36 and fourth term 27.

Find

- (a) the common ratio of the series, (2)
- (b) the fifth term of the series, (2)
- (c) the sum to infinity of the series. (4)

6.

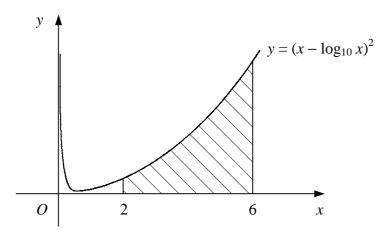


Figure 1

Figure 1 shows the curve with equation  $y = (x - \log_{10} x)^2$ , x > 0.

(a) Copy and complete the table below for points on the curve, giving the y values to 2 decimal places.

x	2	3	4	5	6
У	2.89	6.36			

The shaded area is bounded by the curve, the x-axis and the lines x = 2 and x = 6.

- (b) Use the trapezium rule with all the values in your table to estimate the area of the shaded region. (4)
- (c) State, with a reason, whether your answer to part (b) is an under-estimate or an over-estimate of the true area. (2)

7. 
$$f(x) = 2 + 6x^2 - x^3.$$

- (a) Find the coordinates of the stationary points of the curve y = f(x). (5)
- (b) Determine whether each stationary point is a maximum or minimum point. (3)
- (c) Sketch the curve y = f(x). (2)
- (d) State the set of values of k for which the equation f(x) = k has three solutions. (1)

Turn over

**(2)** 

8.

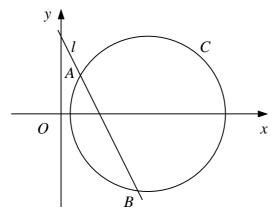


Figure 2

Figure 2 shows the circle C and the straight line l. The centre of C lies on the x-axis and l intersects C at the points A (2, 4) and B (8, -8).

- (a) Find the gradient of l. (2)
- (b) Find the coordinates of the mid-point of AB. (2)
- (c) Find the coordinates of the centre of C. (5)
- (d) Show that C has the equation  $x^2 + y^2 18x + 16 = 0$ . (3)

9.

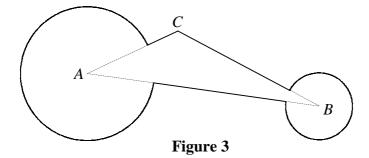


Figure 3 shows a design painted on the wall at a karting track. The sign consists of triangle *ABC* and two circular sectors of radius 2 metres and 1 metre with centres *A* and *B* respectively.

Given that AB = 7 m, AC = 3 m and  $\angle ACB = 2.2$  radians,

- (a) use the sine rule to find the size of  $\angle ABC$  in radians to 3 significant figures, (3)
- (b) show that  $\angle BAC = 0.588$  radians to 3 significant figures, (2)
- (c) find the area of triangle ABC, (2)
- (d) find the area of the wall covered by the design. (5)