

# Core Mathematics C2 Advanced Subsidiary

# For Edexcel

## Paper B

**Time: 1 hour 30 minutes**

### *Instructions and Information*

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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.

The booklet 'Mathematical Formulae and Statistical Tables', available from Edexcel, may be used.

### *Advice to Candidates*

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

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1. Find the first 3 terms, in ascending powers of  $x$ , of the binomial expansion of  $(2 + 5x)^5$  (4)

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2. The circle  $C$  has centre  $(3, 0)$  and passes through the point  $(8, -12)$ .  
Find an equation for  $C$ . (4)

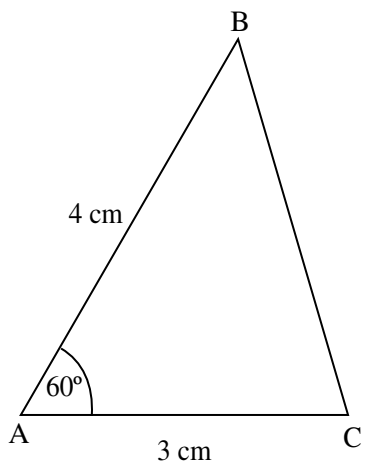
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3. Solve the equations, giving answers to 3 significant figures.  
(a)  $2^x = 5.1$  (2)

(b)  $2^x = 3^{x-1}$  (4)

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4. The diagram shows triangle  $ABC$ .



The lengths of  $AB$  and  $AC$  are 4 cm and 3 cm respectively. The size of angle  $BAC$  is  $60^\circ$ .

(a) Calculate the length of  $BC$ , giving your answer to 3 significant figures. (3)

(b) Calculate the area of triangle  $ABC$ , giving your answer in the form  $k\sqrt{3}$  cm<sup>2</sup>. (3)

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5. Solve the equation

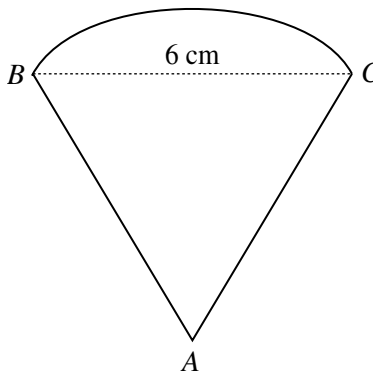
$$\tan^2 \theta - 3 = 0,$$

for  $\theta$  in the interval  $0 < \theta < 2\pi$ . Give your answers in terms of  $\pi$ .

(6)

6.

Figure 1



The shape of a logo is a sector  $ABC$  of a circle with centre  $A$  and radius  $AB$ , as shown in Fig 1. The angle  $BAC$  is 1.2 radians and chord  $BC$  is 6 cm.

(a) Show that the radius  $AB = 5.31$  cm, to 3 significant figures.

(3)

(b) Find the area of the logo, correct to 3 significant figures.

(2)

(c) Find the perimeter of the logo, to 3 significant figures.

(2)

7.

$$f(x) = 2x^3 + 4x^2 + cx + 9, \text{ where } c \text{ is a constant.}$$

Given that  $f(-3) = 0$ ,

(a) find the value of  $c$ ,

(2)

(b) factorise  $f(x)$  as the product of a linear factor and a quadratic factor.

(3)

(c) Hence show that, apart from  $x = -3$  there are no real values of  $x$  for which  $f(x) = 0$ .

(2)

8. A geometric series is  $a + ar + ar^2 + \dots$

(a) Prove that the sum of the first  $n$  terms of this series is

$$S_n = \frac{a(1 - r^n)}{1 - r}. \quad (4)$$

The first and second terms of a geometric series  $G$  are 5 and 3 respectively.

(b) Find, to 3 significant figures, the sum of the first ten terms of  $G$ . (3)

(c) Find the sum to infinity of  $G$ . (2)

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9. The gradient of a curve is given by  $\frac{dy}{dx} = 2 - 2x$ .

The curve passes through the point  $(3, -3)$ .

(a) Find the equation of the curve. (4)

(b) Sketch the curve with equation  $y = 2x - x^2$ . (2)

(c) Find the area of the region enclosed between the curve and the  $x$ -axis. (5)

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10. A curve has equation

$$y = x^4 - 4x^3 - 8x^2 + 17.$$

(a) Find  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$ . (5)

(b) Find the three values of  $x$  for which  $\frac{dy}{dx} = 0$ . (4)

(c) Determine the coordinates of the point at which  $y$  has a maximum value. (5)

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**END**

**TOTAL 75 MARKS**