# Core Mathematics C2 For Edexcel Advanced Subsidiary

## Paper A

## 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.

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

*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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80 Attimore Road
Welwyn Garden City
Herts. AL8 6LP

Tel. 01707 333232

**1.** Find the first three terms, in ascending powers of $x$, of the binomial expansion of $(1 + 2x)^7$ giving each term in its simplest form.

**(4)**

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**2.** Given that

$$\int_1^4 (6x^2 + cx)dx = 96,$$

Find the value of the constant $c$. **(6)**

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**3.** In a geometric series the common ratio is equal to twice the first term. The sum to infinity of this series is 8.

Find the exact value of the first term of this series **(4)**

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**4.** Find, giving your answer to 3 significant figures where appropriate, the value of $x$ for which

($a$) $2^x = 7$

**(3)**

($b$) $\log_3(3x + 1) - \log_3 x = 2$

**(4)**

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**5.** ($a$) Given that $5 \sin x = 7 \cos x$ find the value of $\tan x$.

**(1)**

($b$) Find, to 1 decimal place, all the solutions of

$$5 \sin x - 7 \cos x = 0$$

in the interval $0 \leq x < 360°$.

**(3)**

(c) Find all the solutions of

$$2 \sin^2 y = 2 - \cos y$$

in the interval $0 \leq y < 360°$.

**(6)**

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**6.** (*a*) Given that $(x - 2)$ is a factor of $f(x)$, where

$$f(x) = x^3 + 3x^2 - 4x + k,$$

show that $k = -12$.

**(2)**

(*b*) Divide $f(x)$ by $(x - 2)$ to find a quadratic factor of $f(x)$.

**(2)**

(*c*) Write $f(x)$ as a product of three linear factors.

**(2)**

(*d*) Calculate the remainder when $f(x)$ is divided by $(x - 3)$.

**(2)**

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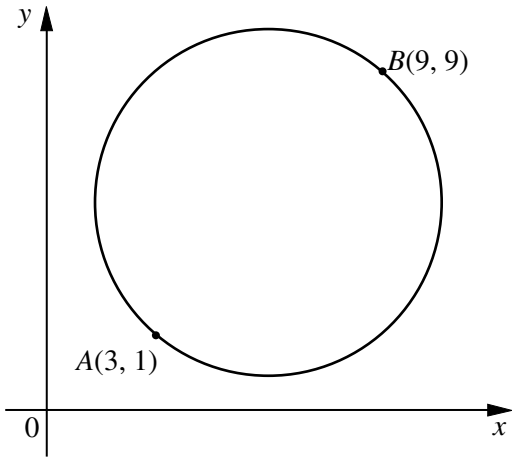
**7.**




The diagram shows a circle which passes through the points $A(3, 1)$ and $B(9, 9)$. $AB$ is a diameter of the circle.

(*a*) Calculate the radius of the circle and the coordinates of the centre.

**(4)**

(*b*) Show that the equation of the circle may be written in the form

$$x^2 + y^2 - 12x - 10y + 36 = 0$$

**(3)**

(*c*) The tangent to the circle at the point $B$ cuts the $y$-axis at $C$. Find the coordinates of $C$.

**(6)**

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**8.**

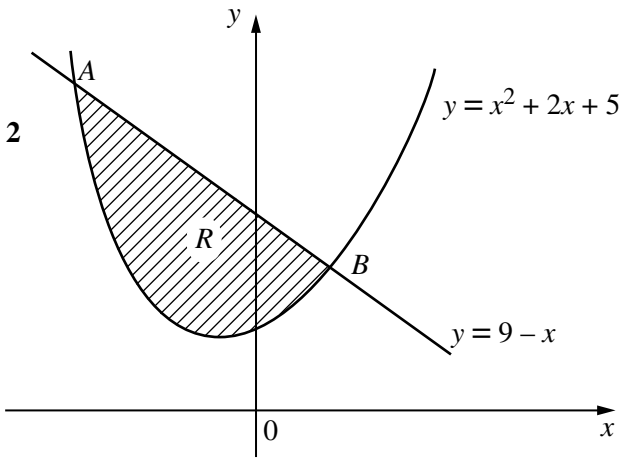


**Figure 2**

The line with equation $y = 9 - x$ cuts the curve with equation $y = x^2 + 2x + 5$ at the points $A$ and $B$, as shown in Figure 2.

($a$) Use algebra to find the coordinates of $A$ and the coordinates of $B$.

**(5)**

The shaded region $R$ is bounded by the line and the curve, as shown in Figure 2.

($b$) Use calculus to find the exact area of $R$.

**(7)**

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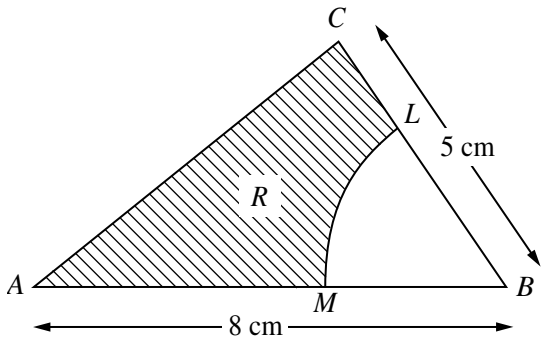
**9.**




Triangle $ABC$ has $AB = 8$ cm, $BC = 5$ cm and $\angle ABC = 1.3$ radians. $A$ circle, centre $B$ and radius 3 cm, intersects $AB$ and $BC$ at $M$ and $L$ respectively.

($a$) Show that, to 3 decimal places, $AC = 8.222$ cm

**(3)**

Calculate,

($b$) the area of sector $BLM$,

**(2)**

($c$) the area of the shaded region $R$,

**(3)**

($d$) the perimeter of the shaded region $R$.

**(4)**

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**END** **TOTAL 75 MARKS**