

GCE Examinations  
Advanced Subsidiary

## **Core Mathematics C2**

Sample Paper from Solomon Press

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.

Mathematical formulae and statistical tables are available.

This paper has nine questions.

### *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. Given that the coefficient of  $x$  in the expansion of  $(1 + ax)^5$  is  $-15$ ,
- (a) find the value of the constant  $a$ , (2)
- (b) find the coefficient of  $x^2$  in the expansion. (2)



**3.**

$$f(x) = 2x^3 - 5x^2 + kx + 3.$$

Given that when  $f(x)$  is divided by  $(x - 2)$  the remainder is  $-9$ ,

(a) find the value of the constant  $k$ . (2)

Given also that  $f(x)$  is exactly divisible by  $(x - 3)$ ,

(b) solve the equation  $f(x) = 0$ . (5)

3. continued

4. (a) Given that  $y = \log_3 x$ , find expressions in terms of  $y$  for

(i)  $\log_3 (27x)$ ,

$$(ii) \quad \log_9 x. \tag{4}$$

- (b) Hence, or otherwise, solve the equation

$$\log_3 (27x) + \log_9 x = 0,$$

giving your answer as an exact fraction. (3)

4. continued

5. Find the values of  $x$  in the interval  $0 \leq x \leq 360^\circ$  for which

$$5 \sin^2 x + \sin x - \cos^2 x = 0,$$

giving your answers to 1 decimal place where appropriate.

(8)



5. continued



6. continued



7. continued

8. (a) Prove that the sum,  $S_n$ , of the first  $n$  terms of a geometric series with first term  $a$  and common ratio  $r$  is given by

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

A geometric series has first term  $p$  and sum to infinity  $4p$ .

- (b) Find the common ratio of the series. (3)

- (c) Find the sum of the first ten terms of the series as a percentage of the sum to infinity of the series. (4)

8. continued





9. continued

9. continued

**END**