Paper Reference (complete below)	Centre No.	Surname	Initial(s)
6663 / 01	Candidate No.	Signature	

Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C1

Advanced Subsidiary

Set A: Practice Paper 3

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

Materials required for examination
Mathematical Formulae

Items included with question papers
Nil

Calculators may NOT be used in this examination.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. You must write your answer for each question in the space following the question. If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
This paper has nine questions.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the examiner.
Answers without working may gain no credit.

Turn over

1. $$\frac{dy}{dx} = 5 + \frac{1}{x^2}.$$

(*a*) Use integration to find y in terms of x.

(3)

(*b*) Given that $y = 7$ when $x = 1$, find the value of y at $x = 2$.

(4)

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2. The sum of an arithmetic series is

$$\sum_{r=1}^{n} (80 - 3r).$$

(*a*) Write down the first two terms of the series.

(2)

(*b*) Find the common difference of the series.

(1)

Given that $n = 50$,

(*c*) find the sum of the series.

(3)

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3. The points A and B have coordinates (1, 2) and (5, 8) respectively.

(*a*) Find the coordinates of the mid-point of AB.

(2)

(*b*) Find, in the form $y = mx + c$, an equation for the straight line through A and B.

(4)

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4. (*a*) Solve the equation $4x^2 + 12x = 0$.

(3)

$$f(x) = 4x^2 + 12x + c,$$

where c is a constant.

(*b*) Given that $f(x) = 0$ has equal roots, find the value of c and hence solve $f(x) = 0$.

(4)

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5. Find the set of values for x for which

(a) $6x - 7 < 2x + 3$,

(2)

(b) $2x^2 - 11x + 5 < 0$,

(4)

(c) both $6x - 7 < 2x + 3$ and $2x^2 - 11x + 5 < 0$.

(1)

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6. Given that $\text{f}(x) = 15 - 7x - 2x^2$,

(a) find the coordinates of all points at which the graph of $y = \text{f}(x)$ crosses the coordinate axes.

(3)

(b) Sketch the graph of $y = \text{f}(x)$.

(2)

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7. Initially the number of fish in a lake is 500 000. The population is then modelled by the recurrence relation

$$u_{n+1} = 1.05u_n - d, \quad u_0 = 500\,000.$$

In this relation u_n is the number of fish in the lake after n years and d is the number of fish which are caught each year.

Given that $d = 15\,000$,

(a) calculate u_1, u_2 and u_3 and comment briefly on your results.

(3)

Given that $d = 100\,000$,

(b) show that the population of fish dies out during the sixth year.

(3)

(c) Find the value of d which would leave the population each year unchanged.

(2)

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8. A curve C has equation $y = x^3 - 5x^2 + 5x + 2$.

(*a*) Find $\frac{dy}{dx}$ in terms of x.

(2)

The points P and Q lie on C. The gradient of C at both P and Q is 2. The x-coordinate of P is 3.

(*b*) Find the x-coordinate of Q.

(2)

(*c*) Find an equation for the tangent to C at P, giving your answer in the form $y = mx + c$, where m and c are constants.

(3)

This tangent intersects the coordinate axes at the points R and S.

(*d*) Find the length of RS, giving your answer as a surd.

(4)

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9. The points $A(-1, -2)$, B (7, 2) and $C(k, 4)$, where k is a constant, are the vertices of $\Delta\, ABC$. Angle ABC is a right angle.

(*a*) Find the gradient of AB.

(2)

(*b*) Calculate the value of k.

(2)

(*c*) Show that the length of AB may be written in the form $p\sqrt{5}$, where p is an integer to be found.

(3)

(*d*) Find the exact value of the area of $\Delta\, ABC$.

(3)

(*e*) Find an equation for the straight line l passing through B and C. Give your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(2)

END