FOR EDEXCEL

GCE Examinations

Advanced Subsidiary

Core Mathematics C1

Paper C

Time: 1 hour 30 minutes

Instructions and Information

Candidates may NOT use a calculator in this paper

Full marks may be obtained for answers to ALL questions.

Mathematical formulae and statistical tables are available.

This paper has ten 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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1. Solve the equation

$$x^2 - 4x - 8 = 0,$$

giving your answers in the form $a + b\sqrt{3}$ where a and b are integers. **(3)**

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2. Find the set of values of x for which

$$(x - 1)(x - 2) < 20.$$ **(4)**

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3. The curve with equation $y = \mathrm{f}(x)$ passes through the point (8, 7).

Given that

$$\mathrm{f}'(x) = 4x^{\frac{1}{3}} - 5,$$

find $\mathrm{f}(x)$. **(6)**

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4. *(a)* Evaluate $(5\frac{4}{9})^{-\frac{1}{2}}$. **(2)**

(b) Find the value of x such that

$$\frac{1+x}{x} = \sqrt{3},$$

giving your answer in the form $a + b\sqrt{3}$ where a and b are rational. **(4)**

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5. Given that

$$y = x + 5 + \frac{3}{\sqrt{x}},$$

(a) find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$, **(3)**

(b) find $\int y \, \mathrm{d}x$. **(4)**

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6. $\mathrm{f}(x) = x^{\frac{3}{2}} - 8x^{-\frac{1}{2}}$.

(a) Evaluate f(3), giving your answer in its simplest form with a rational denominator. **(3)**

(b) Solve the equation $\mathrm{f}(x) = 0$, giving your answers in the form $k\sqrt{2}$. **(4)**

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7. The straight line l_1 has gradient 2 and passes through the point with coordinates (4, −5).

(a) Find an equation for l_1 in the form $y = mx + c$. **(2)**

The straight line l_2 is perpendicular to the line with equation $3x - y = 4$ and passes through the point with coordinates (3, 0).

(b) Find an equation for l_2. **(3)**

(c) Find the coordinates of the point where l_1 and l_2 intersect. **(3)**

8.

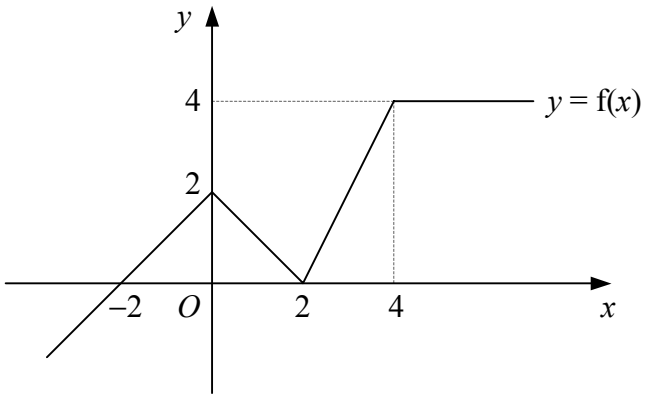


Figure 1

Figure 1 shows the graph of $y = \mathrm{f}(x)$.

(a) Write down the number of solutions that exist for the equation

(i) $\mathrm{f}(x) = 1$,

(ii) $\mathrm{f}(x) = -x$. **(2)**

(b) Labelling the axes in a similar way, sketch on separate diagrams the graphs of

(i) $y = \mathrm{f}(x - 2)$,

(ii) $y = \mathrm{f}(2x)$. **(6)**

Turn over

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9. *(a)* Prove that the sum of the first n terms of an arithmetic series with first term a and common difference d is given by

$$\tfrac{1}{2}n[2a + (n - 1)d]. \quad \textbf{(4)}$$

A novelist begins writing a new book. She plans to write 16 pages during the first week, 18 during the second and so on, with the number of pages increasing by 2 each week.

Find, according to her plan,

(b) how many pages she will write in the fifth week, **(2)**

(c) the total number of pages she will write in the first five weeks. **(2)**

(d) Using algebra, find how long it will take her to write the book if it has 250 pages. **(4)**

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10. The curve C has the equation $y = \mathrm{f}(x)$ where

$$\mathrm{f}(x) = (x + 2)^3.$$

(a) Sketch the curve C, showing the coordinates of any points of intersection with the coordinate axes. **(3)**

(b) Find $\mathrm{f}'(x)$. **(4)**

The straight line l is the tangent to C at the point P $(-1, 1)$.

(c) Find an equation for l. **(3)**

The straight line m is parallel to l and is also a tangent to C.

(d) Show that m has the equation $y = 3x + 8$. **(4)**

END

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