GCE Examinations Advanced Subsidiary

Core Mathematics C1

Sample Paper from Solomon Press 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.



Written by Shaun Armstrong © Solomon Press

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1. Find the set of values of x for which	
$2x^2 - 11x + 12 < 0.$	(4)
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. <i>(a)</i>	Express $(6\frac{1}{4})^{-\frac{1}{2}}$ as an exact fraction in its simplest form.	(2)
<i>(b)</i>	Find the value of <i>x</i> such that	
	$2^{x+1} = 4\sqrt{2}$.	(3)

3.	A sequence is defined by the recurrence relation	Leave blank
	$u_{n+1} = 8 + ku_n, n \ge 1, u_1 = 3,$	
	where <i>k</i> is a constant.	
	Given that $u_3 = 11$,	
	(a) find the two possible values of k . (5))
	Given also that $k < 0$,	
	(b) find the value of u_4 . (1))

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4.	(a) Find $\int (6x^{\frac{1}{2}} - x) dx$.	(2)	
	The curve with equation $y = f(x)$ passes through the point with coordinates $(1, 6\frac{1}{2})$ and is such that		
	$f'(x) = 6x^{\frac{1}{2}} - x.$		
	(b) Show that the point with coordinates (4, 27) lies on the curve $y = f(x)$.	(4)	

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5.	Solve the simultaneous equations	olalik
	2x - y + 9 = 0	
	2x - y + 9 = 0 $x^{2} + 2xy + y^{2} = 9$ (*	7)
	x + 2xy + y = y	')
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6. A curve has the equation $y = x + \frac{8}{x} + 3.$ (a) Find the gradient of the curve at the point P (2, 9). (4) The tangent to the curve at the point Q is parallel to the tangent to the curve at P. (b) Find the coordinates of Q. (3)
(a) Find the gradient of the curve at the point $P(2, 9)$.(4)The tangent to the curve at the point Q is parallel to the tangent to the curve at P .
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(b) Find the coordinates of Q . (3)

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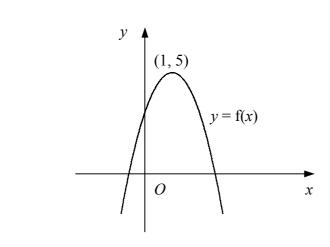




Figure 1 shows the curve with equation y = f(x) which has a turning point at (1, 5).

(a) Showing the coordinates of the turning point in each case, sketch on separate diagrams in the spaces provided the curves with equations

(i)
$$y = f(x + 3),$$

(ii) $y = f(2x).$ (4)

(b) Given also that

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$$\mathbf{f}(x) = ax^2 + bx + 3,$$

find the values of the constants *a* and *b*.

(4)

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3.	In a in th	orts club has 400 members when it launches a scheme to recruit new members. model of the outcome of the scheme, it is assumed that 20 new members join e first month, 24 in the second month, 28 in the third month and so on, with the ber joining the club increasing by 4 in each subsequent month.	
	Usin	g this model,	
	(a)	find the number of new members who join the club in the eighth month of the scheme,	(2)
	<i>(b)</i>	find the total number of new members who join the club during the first year of the scheme.	(2)
	The	model also assumes that the club will lose 8 members each month.	
	(c)	Find how many months the scheme would have to run for before the total membership of the club is 1000.	(6)

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9.	The strai	ght line l_1 passes through the points $A(-2, 2)$ and $B(1, 3)$.	Leave
9.		ght line i_1 passes through the points $A(-2, 2)$ and $B(1, 3)$.	
		and an equation for l_1 , giving your answer in the form $ax + by + c = 0$, ere <i>a</i> , <i>b</i> and <i>c</i> are integers.	(4)
	The straig	ght line l_2 is perpendicular to l_1 and passes through the point $C(9, -1)$.	
	<i>(b)</i> Fin	and an equation for l_2 .	(2)
	Given the	at l_1 and l_2 intersect at the point D ,	
	<i>(c)</i> sho	by that the ratio of the length of AB to the length of AD is $1:3$	(5)
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10.	The curve C has the equation $y = x^3 - 4x^2 + x + 6$.		olulik
	(a) Show that $(x+1)(x-2)(x-3) \equiv x^3 - 4x^2 + x + 6$.	(2)	
	(b) Sketch the curve C in the space provided, showing the coordinates of any points of intersection with the coordinate axes.	(3)	
	The point <i>P</i> on <i>C</i> has <i>x</i> -coordinate 1.		
	(c) Find an equation of the tangent to C at P .	(6)	

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