Surname	Other n	ames
Pearson Edexcel GCE	Centre Number	Candidate Number
Coro Mat		- ()
Advanced Subsid	liary	SCZ
Advanced Subsid Wednesday 24 May 201 Time: 1 hour 30 minut	7 – Morning	S C Z Paper Reference 6664/01

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B). Coloured pencils and highlighter pens must not be used.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided there may be more space than you need.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over 🕨



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Past Paper This resource was created and owned by Pearson Edexcel Leave blank Find the first 4 terms, in ascending powers of x, of the binomial expansion of 1. $\left(3-\frac{1}{3}x\right)^5$ giving each term in its simplest form. (4) 2 P 4 4 8 2 4 A 0 2 3 2

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Mathematics C2

6664

Question Number	Scheme	Marks
1	$\left(3 - \frac{1}{3}x\right)^5 - \frac{1}{3}x^5 + \frac{5}{3}C 3^4 \left(-\frac{1}{3}x\right) + \frac{5}{3}C 3^3 \left(-\frac{1}{3}x\right)^2 + \frac{5}{3}C 3^2 \left(-\frac{1}{3}x\right)^3$	
1.	First term of 243	B1
	$ ({}^{5}C_{1} \times \dots \times x) + ({}^{5}C_{2} \times \dots \times x^{2}) + ({}^{5}C_{2} \times \dots \times x^{3}) \dots $	M1
	$=(243) -\frac{405}{3}x + \frac{270}{9}x^2 - \frac{90}{27}x^3$	A1
	$=(243) - 135x + 30x^2 - \frac{10}{3}x^3$	A1 (4)
		[4]
Alternative method	$\left(3 - \frac{1}{3}x\right)^5 = 3^5 \left(1 - \frac{x}{9}\right)^5$	
	$3^{5}(1 + {}^{5}C_{1}(-\frac{1}{9}x) + {}^{5}C_{2}(-\frac{1}{9}x)^{2} + {}^{5}C_{3}(-\frac{1}{9}x)^{3} \dots)$	
	Scheme is applied exactly as before	
	Notes B1: The constant term should be 243 in their expansion	
	M1: Two of the three binomial coefficients must be correct and must be with the correct power	r of <i>x</i> .
	Accept ${}^{5}C_{1}$ or $\begin{pmatrix} 5\\1 \end{pmatrix}$ or 5 as a coefficient, and ${}^{5}C_{2}$ or $\begin{pmatrix} 5\\2 \end{pmatrix}$ or 10 as another and ${}^{5}C_{3}$ or $\begin{pmatrix} 5\\3 \end{pmatrix}$ or	: 10 as
	another Pascal's triangle may be used to establish coefficients. NB: If they only include two of these terms then the M1 may be awarded.	the first
	A1: Two of the final three terms correct – may be unsimplified i.e. two of $-135x + 30x^2 - \frac{10}{3}$	x^3
	correct, or two of $-\frac{405}{3}x + \frac{270}{9}x^2 - \frac{90}{27}x^3$ (may be just two terms)	
	A1: All three final terms correct and simplified. (Can be listed with commas or appear on sepa	rate lines.
	Accept in reverse order.) Accept correct alternatives to $-\frac{10}{3}$ e.g. $-3\frac{1}{3}$ or -3.3 the recurring n	nust be
	clear. 3.3 is not acceptable. Allow e.g. $+ -135x$	
	e.g. The common error $3^5 + {}^5C_1 3^4 (-\frac{1}{3})x + {}^5C_2 3^3 (-\frac{1}{3})x^2 + {}^5C_3 3^2 (-\frac{1}{3})x^3 = (243) - 135x - 90x^2$ would earn B1, M1, A0, A0, so 2/4 If extra terms are given then isw No negative signs in answer also earns B1, M1, A0, A0 If the series is divided through by 3 at the final stage after an error or omission resulting in all of three coefficients then apply scheme to series before this division and ignore subsequent wo	$-30x^3$ multiple ork (isw)
	Special Case: Only gives first three terms = $(243) - 135x + 30x^2$ or $243 - \frac{405}{3}x + \frac{270}{9}x$	¢ ²
	Follow the scheme to give B1 M1 A1 A0 special case. (Do not treat as misread.)	
	Answers such as $243 + 405 - \frac{1}{3}x + 270 - \frac{1}{9}x^2 + 90 - \frac{1}{27}x^3$ gain no credit as the binomial coe are not linked to the x terms	fficients

JMME st Paper	2017 www.mystudybro.com I This resource was created and owned by Pearson Edexcel	Mathematics C
		Leav
2.	In the triangle <i>ABC</i> , $AB = 16$ cm, $AC = 13$ cm, angle $ABC = 50^{\circ}$ and angle $BCA =$	x° blan
	Find the two possible values for x_{ij} giving your answers to one decimal place.	
		(4)
4		

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Question Number	Scheme	Marks
2.	$\frac{\sin x}{16} = \frac{\sin 50^\circ}{13}$	M1
	$(\sin x) = \frac{16 \times \sin 50}{13} (= 0.943 \text{ but accept } 0.94)$	A1
	<i>x</i> = awrt 70.5(3) and 109.5 or 70.6 and 109.4	dM1 A1 (4) [4]
	Notos	[4]
	Notes M1: use sine formula correctly in any form. Allow awrt 0.77 for $\sin 50^{\circ}$ A1: give the correct value or correct expression for $\sin x$ (this implies the M1 mark). If it is given as expression they do not need degrees symbol. $\frac{\sin 50 \times 16}{10}$ is fine,	
	 If this is given as a decimal allow answers which round to 0.94. Allow awrt -0.323 (radians) here but no further marks are available. If they give this as x (not sinx) and do not recover this is A0 dM1: Correct work leading to x= (via inverse sin) expression or value for sinx If the previous A mark has been awarded for a correct expression then this is for 70.5 or 109.5 (allow for 70.6 or 109.4). If the previous A mark was not gained, e.g. rounding errors were made in rearran 	getting to awrt
	 and previous 11 mark was not gamed, e.g. rounding errors were made in rearrant sine formula then award dM1 for evidence of use of inverse sin in degrees on th sinx (may need to check on calculator). NB 70.5 following a correct sine formula will gain M1A1M1. A1: deduce and state both of the answers x = 70.5 and 109.5 (do not need degrees) A these. Also accept 70.6 and 109.4. (Second answer is sometimes obtained by a long indirect route but still scores A1) 	eir value for
	If working in radians throughout, answers are 1.23 and 1.91 and this can be awarded (Working with 50 radians gives probable answers of -0.3288 and 3.47 giving M1A1M	M1 A1 M1 A0 10A0)
	Special case: Wrong labelling of triangle. This simplifies the problem as there is only for angle <i>x</i> . So it is not treated as a misread. If they find the missing side as awrt 12.6 find an angle or its sine or cosine then give M1A0M0A0	v one solution then proceed to
	Alternative Method using cosine rule Let $BC = a$. M1: uses the cosine rule to form to form a three term quadratic equation in a (e.g.	
	$a^2 - 32a\cos 50^\circ + 87 = 0$ or $a^2 - awrt 20.6a + 87 = 0$ though allow slips in signs real A1: Solves and obtains a correct value for <i>a</i> of awrt 14.6 or awrt 5.95. dM1: A correct full method to find (at least) one of the two angles. May use cosine refind angle <i>BAC</i> and then use sine rule. As in the main scheme, if the previous A mark awarded then they should obtain one of the correct angles for this mark. A1: deduces both correct answer as in main scheme.	earranging) ule again, or has been
	NB obtaining only one correct angle will usually score M1A1M1A0 in any method.	

Mathematics C2

Leave blank

3. (a)

Complete the table below, by giving the value of *y* when x = 1

x	0	0.5	1	1.5	2
У	1	2.821		12.502	26.585

 $y = 5^x + \log_2(x+1), \qquad 0 \le x \le 2$

(b) Use the trapezium rule, with all the values of y from the completed table, to find an approximate value for

$$\int_{0}^{2} (5^{x} + \log_{2}(x+1)) \, \mathrm{d}x$$

giving your answer to 2 decimal places.

(4)

(1)

(c) Use your answer to part (b) to find an approximate value for

$$\int_0^2 (5 + 5^x + \log_2(x+1)) \, \mathrm{d}x$$

giving your answer to 2 decimal places.

(1)



Question Number	Scheme							Marks	
		x	0	0.5	1	15	2		
3.		y	1	2.821	6	12.502	26.585		
(a)	$\{\text{At } x = 1, \}$	y = 6 (allo	w 6.000 oi	even 6.00)					B1 cao
(b)	$\frac{1}{2} \times 0.5$;								(1) B1 oe
	- {1-	+ 26.585+2	2(2.821+	their 6+12.5	502)}	For s	tructure of {	};	M1 <u>A1ft</u>
	$\frac{1}{2} \times 0.5 \left\{ 1 + \right\}$	- 26.585+2	(2.821+ 0	5+12.502)}	$\left\{=\frac{1}{4}(70.23)\right\}$	1) = 17.557.	$.\} = awrt 17.$	56	A1
(c)	10 + "17.56	" = "27.56)"						(4) B1ft (1)
									[6]
(a)	B1· 6				Notes				
(b)	B1: for usin	$g_{\frac{1}{2}} \times 0.5$ or	$\frac{1}{4}$ or equi	valent.					
	M1: requires the correct {} bracket structure. It needs the first bracket to contain first y value plus last y value and the second bracket to be multiplied by 2 and to be the summation of the remaining y values in the table with no additional values. If the only mistake is a copying error or is to omit one value from 2nd bracket this may be regarded as a slip and the M mark can be allowed (An extra repeated term forfeits the M mark however). M0 if values used in brackets are x values instead of y values A1ft: for the correct bracket {} following through candidate's y value found in part (a). A1: for answer which rounds to 17.56 NB : Separate trapezia may be used: B1 for 0.25, M1 for $1/2 h(a + b)$ used 3 or 4 times (and A1ft if it is all correct) Then A1 as before.								plus last alues in from 2nd feits the if it is all
	Special case	e: Bracketin	g mistake	$0.25 \times (1+2)$	(6.585) + 2(2)	2.821 + their	6+12.502)	scores B1 M1 A	.0 A0
	An answer of	of 49.542 u	sually indi	at the calcula cates this err	or.	en done corr	ectly (then fi	ull marks can be	e given).
(c)	B1ft: 10 + the May be obt	heir answer tained by us	to part (b) sing the tra	pezium rule	again with a	ll values for	y increased	by 5)	



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Question Number	Scheme	Marks			
4. (a)	Usually answered in radians: Uses $BCD = 3.5 \times (angle)$, $= 3.5 \times 1.77 = 6.195$ (m) (accept awrt 6.20)	M1 A1 (2)			
(b)	Area = $\frac{1}{2}(3.5)^2 \times 1.77 = 10.84$ (m ²)	M1 A1			
(c)	Area of triangle = $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\text{angle})$, = $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\frac{\pi}{2} - \frac{1.77}{2})$ (=awrt 4.1) Total area = "10.84"+2×"4.101"	(2) M1, A1 M1			
	= 19.04	A1cao (4)			
	Notos	լօյ			
(a)	M1: uses $s = 35 \times A$ with A in radians or completely correct work in degrees				
(u)	All owner 6 20 on just 6 2 (do not need to see units) Connect answer conjugate the method				
(b)	A1: awrt 6.20 or just 6.2 (do not need to see units) Correct answer can imply the method. M1 for attempt to man $A = \frac{1}{2} 25^2 = 0$ (A count Q in degree)				
(0)	MI for attempt to use $A = \frac{1}{2} \times 3.5 \times 0$ (Accept θ in degrees.)				
	A1 for awrt 10.84 (do not need to see units) isw if correct answer is followed by 10.8. Correct can imply the method	ct answer			
(c)	M1: Uses area of triangle $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\text{angle})$ Must be correct method for area of triangle	e but may			
	be less direct.				
	A1: Correct expression using correct angle i.e. $\frac{\pi}{2} - \frac{1.77}{2}$ or awrt 0.69 or awrt 39 degrees (need	l at least 2			
	sf if no other work seen, but may be implied by correct final answer) If correct expression is a isw (so e.g. isw an answer of 0.0775 implying angle set to degrees on calculator)	given then			
	M1: Adds twice their second calculated area (even if rectangle or segment) to their sector area (may have been slips or errors in one or both formulae – such as missing ½ or mixture of degrees and radians or weak attempt at triangle area) so M0A0M1A0 is a possible mark distribution				
	A1: 19.04 cao (common answer through insufficient accuracy is 19.08 which loses final mar	k)			
	Special Case . The mark profile M1A0M1A0M1A0M1A0 can be given if the angle is misune as 1.77π or as <i>AFB</i> for example	lerstood			
	If "10.84"+ $3.5 \times 3.7 \sin(\text{angle})$ is used then this can gain both M marks and the A marks if	correct.			
	But use of $3.5 \times 3.7 \sin(\text{angle})$ and later doubled and added to "10.84" is 1 st M0, 2 nd M1.				

Question number	Scheme	Marks
5	$x^2 + y^2 - 10x + 6y + 30 = 0$	
(a)	Uses any appropriate method to find the coordinates of the centre, e.g achieves $(x \pm 5)^2 + (y \pm 3)^2 = \dots$ Accept ($\pm 5, \pm 3$) as indication of this.	M1

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5.	The circle C has equation	Leave blank	
	$x^2 + y^2 - 10x + 6y + 30 = 0$		
	Find		
	(a) the coordinates of the centre of C		
	(a) the coordinates of the centre of C,	(2)	
	(b) the radius of <i>C</i> ,	(2)	
		(2)	
	(c) the y coordinates of the points where the circle C crosses the line with equation $x =$ giving your answers as simplified surds.	4,	
		(3)	
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Question Number	Scheme	Marks			
4. (a)	Usually answered in radians: Uses $BCD = 3.5 \times (angle)$, $= 3.5 \times 1.77 = 6.195$ (m) (accept awrt 6.20)	M1 A1 (2)			
(b)	Area = $\frac{1}{2}(3.5)^2 \times 1.77 = 10.84$ (m ²)	M1 A1			
(c)	Area of triangle = $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\text{angle})$, = $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\frac{\pi}{2} - \frac{1.77}{2})$ (=awrt 4.1) Total area = "10.84"+2×"4.101"	(2) M1, A1 M1			
	= 19.04	A1cao (4)			
	Notos	լօյ			
(a)	M1: uses $s = 35 \times A$ with A in radians or completely correct work in degrees				
(u)	All owner 6 20 on just 6 2 (do not need to see units) Connect answer conjugate the method				
(b)	A1: awrt 6.20 or just 6.2 (do not need to see units) Correct answer can imply the method. M1 for attempt to man $A = \frac{1}{2} 25^2 = 0$ (A count Q in degree)				
(0)	MI for attempt to use $A = \frac{1}{2} \times 3.5 \times 0$ (Accept θ in degrees.)				
	A1 for awrt 10.84 (do not need to see units) isw if correct answer is followed by 10.8. Correct can imply the method	ct answer			
(c)	M1: Uses area of triangle $\frac{1}{2} \times 3.7 \times 3.5 \times \sin(\text{angle})$ Must be correct method for area of triangle	e but may			
	be less direct.				
	A1: Correct expression using correct angle i.e. $\frac{\pi}{2} - \frac{1.77}{2}$ or awrt 0.69 or awrt 39 degrees (need	l at least 2			
	sf if no other work seen, but may be implied by correct final answer) If correct expression is a isw (so e.g. isw an answer of 0.0775 implying angle set to degrees on calculator)	given then			
	M1: Adds twice their second calculated area (even if rectangle or segment) to their sector area (may have been slips or errors in one or both formulae – such as missing ½ or mixture of degrees and radians or weak attempt at triangle area) so M0A0M1A0 is a possible mark distribution				
	A1: 19.04 cao (common answer through insufficient accuracy is 19.08 which loses final mar	k)			
	Special Case . The mark profile M1A0M1A0M1A0M1A0 can be given if the angle is misune as 1.77π or as <i>AFB</i> for example	lerstood			
	If "10.84"+ $3.5 \times 3.7 \sin(\text{angle})$ is used then this can gain both M marks and the A marks if	correct.			
	But use of $3.5 \times 3.7 \sin(\text{angle})$ and later doubled and added to "10.84" is 1 st M0, 2 nd M1.				

Question number	Scheme	Marks
5	$x^2 + y^2 - 10x + 6y + 30 = 0$	
(a)	Uses any appropriate method to find the coordinates of the centre, e.g achieves $(x \pm 5)^2 + (y \pm 3)^2 = \dots$ Accept ($\pm 5, \pm 3$) as indication of this.	M1

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	Centre is (5, -3).		A1	(2)
(b) Way 1	Uses $(x \pm "5")^2 - "5^2" + (y \pm "3")^2 - r = \sqrt{"25" + "9" - 30}$ or $r^2 = "25" + "9" - 30$	-"32" + 30 = 0 to give "9"-30 (not 30 - 25 - 9)	M1	
	<i>r</i> = 2		A1cao	
Or Way 2	Using $\sqrt{g^2 + f^2 - c}$ from $x^2 + y^2 + stated$ or correct working)	2gx + 2fy + c = 0 (Needs formula	M1	(2)
	<i>r</i> = 2		A1	
(c) Way 1	Use $x = 4$ in <i>an</i> equation of circle and	obtain equation in y only	M1	(2)
	e.g $(4-5)^2 + (y+3)^2 = 4$ or a	$4^2 + y^2 - 10 \times 4 + 6y + 30 = 0$		
	Solve their quadratic in y and obtain t	wo solutions for <i>y</i>	dM1	
	e.g. $(y+3)^2 = 3$ or $y^2 + 6y + 6 = 0$) so $y = -3 \pm \sqrt{3}$	A1	
Or Way 2	\mathcal{Q}	Divide triangle <i>PTQ</i> and use Pythagoras with " r " ² -("5"-4) ² = h^2 ,	M1	(3)
	$\frac{h}{1}$	Find <i>h</i> and evaluate $"-3"\pm h$. May recognise $(1,\sqrt{3}, 2)$ triangle.	dM1	
	h P P	So $y = -3 \pm \sqrt{3}$	A1	(3) [7]

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	Notes
(a)	Parts (a) and (b) can be marked together M1 as in scheme and can be <u>implied</u> by $(\pm 5, \pm 3)$ May be awarded for writing LHS as $(n \pm 5)^2 + (n \pm 2)^2$
	$\frac{(x \pm 5)}{(x \pm 5)} + \frac{(y \pm 5)}{(y \pm 5)} = \dots$ or by comparing with $x^2 + y^2 + 2gx + 2fy + c = 0$ to write down centre $(-g, -f)$ directly A1: $(5, -3)$. This correct answer implies M1A1
(b)	M1 for a full correct method leading to $r =$, or $r^2 =$ with their 5, their -3, their 25 and their 9 and their "-30". Completion of square method errors result in M0 here. Usually $r = 4$ or $r = 16$ imply M0A0 A1 2 cao Do not accept $r = \pm 2$ unless it is followed by $(r =)$ 2 The correct answer with no wrong work seen implies M1A1
(c)	Special case : if centre is given as $(-5, -3)$ or $(5, 3)$ or $(-5, 3)$ allow M1A1 for $r = 2$ worked correctly. i.e. $r^2 = "25"+"9"-30$ M1 : <i>Way 1</i> : Use $x = 4$ in a circle equation (may have wrong centre and/or radius) to obtain an equation in <i>y</i> only or <i>Way 2</i> . Uses geometry to find equation in <i>h</i> (ft on their radius and centre) dM1 : (needs first method mark) Solve their quadratic in <i>y</i> or <i>Way 2</i> . Uses their <i>h</i> and their <i>y</i>
	coordinate correctly A1: cao

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$f(x) = -6x^3 - 7x^2 + 40x + 21$	
Use the factor theorem to show that $(x + 3)$ is a factor of $f(x)$	(2)
Factorise $f(x)$ completely.	(4)
Hence solve the equation	
$6(2^{3y}) + 7(2^{2y}) = 40(2^y) + 21$	
giving your answer to 2 decimal places.	(3)
	This resource was created and owned by Pearson Edexcel $f(x) = -6x^{3} - 7x^{2} + 40x + 21$ Jse the factor theorem to show that (x + 3) is a factor of f(x) Factorise f(x) completely. Hence solve the equation $6(2^{3y}) + 7(2^{2y}) = 40(2^{y}) + 21$ giving your answer to 2 decimal places.

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Question Number	Scheme	Marks	
6. (a)	Attempt $f(3)$ or $f(-3)$ Use of long division is M0A0 as factor theorem was required.	M1	
	f(-3) = 162 - 63 - 120 + 21 = 0 so $(x + 3)$ is a factor	A1	
		(2)	
(b)	Either (Way 1): $f(x) = (x + 3)(-6x^2 + 11x + 7)$	M1A1	
	= (x + 3)(-3x + 7)(2x + 1) or $-(x + 3)(3x - 7)(2x + 1)$	M1A1	
	Or (Way 2) Uses trial or factor theorem to obtain $x = -1/2$ or $x = 7/3$	(4) M1	
	Uses trial or factor theorem to obtain both $x = -1/2$ and $x = 7/3$	A1	
	Puts three factors together (see notes below)	M1	
	Correct factorisation : $(x+3)(7-3x)(2x+1)$ or $-(x+3)(3x-7)(2x+1)$ oe	A1 (4)	
	Or (Way 3) No working three factors $(x + 3)(-3x + 7)(2x + 1)$ otherwise need working	M1A1M1A1	
	(1, 1, 2, 3) = 100 working uncertainty (x + 3)(-3x + 7)(2x + 1) outerwise need working	(4)	
(c)	$2^{y} = \frac{7}{3}, \rightarrow \log(2^{y}) = \log(\frac{7}{3}) \text{ or } y = \log_{2}(\frac{7}{3}) \text{ or } \frac{\log(7/3)}{\log 2}$	B1, M1	
	$\{v = 1.222392421\} \implies v = awrt 1.22$	A1	
		(3)	
	Notes	[9]	
(a)	M1 for attempting either $f(3)$ or $f(-3)$ – with numbers substituted into expression		
	A1 for calculating $f(-3)$ correctly to 0, and they must state $(x + 3)$ is a factor for A1 (or equi	ivalent ie.	
	QED, \Box or a tick). A conclusion may be implied by a preamble, "if $f(-3) = 0$, (x+3) is a factor	or".	
	$-6(-3)^3-7(-3)^2+40(-3)+21=0$ so $(x+3)$ is a factor of $f(x)$ is M1A1 providing bracketing is	is correct.	
(b)	1 st M1: attempting to divide by $(x + 3)$ leading to a 3TQ beginning with the correct term, usu	ally $-6x^2$.	
	This may be done by a variety of methods including long division, comparison of coefficients, inspection etc. Allow for work in part (a) if the result is used in (b)		
	Inspection etc. Allow for work in part (a) if the result is used in (b). 1 st A1: usually for $(-6x^2 + 11x + 7)$. Credit when seen and use isw if misconied		
	¹ A1. usually for $(-0x + 11x + 7)$ Creat when seen and use ISW II miscopied 2 nd M1: for a <i>valid*</i> attempt to factorise their quadratic (* see notes on page 6 - General Principles for		
	Core Mathematics Marking section 1)		
	2^{nd} A1 is cao and needs all three factors together fully factorised. Accept e.g. $-3(x+3)(x-\frac{7}{3})(2x+1)$		
	but $(x + 3)(x - \frac{7}{3})(-6x - 3)$ and $(x + 3)(3x - 7)(-2x - 1)$ are A0 as not fully factorised.		
	Ignore subsequent work (such as a solution to a quadratic equation.)		
	Way 2: The second M mark needs three roots together so $\pm 6(x-\alpha)(x-\beta)(x+3)$ or equivalent	ent where	
	they obtained α and β by trial, so if correct roots identified, then $(x+3)(3x-7)(2x+1)$ can	n gain	
	M1A1M1A0.		
	N.B. Replacing $(-6x^2 + 11x + 7)$ (already awarded M1A1) by $(6x^2 - 11x - 7)$ giving		
	(x+3)(3x-7)(2x+1) can have M1A0 for factorization so M1A1M1A0		
(c)	B1: $2^{y} = \frac{7}{3}$		
	M1: Attempt to take logs to solve $2^y = \alpha$ or $2^y = 1/\alpha$, where $\alpha > 0$ and α was a root of their factorial factorial terms of the solution of the soluti	torization.	
	A1: for an answer that rounds to 1.22. If other answers are included (and not "rejected") such or -1 lose final A mark	as $\ln(-3)$	
	Special case: Those who deal throughout with $f(x) = 6x^3 + 7x^2 - 40x - 21$		
	They may have full credit in part (a). In part (b) they can achieve a maximum of M1A0M1A0	unless	
	they return the negative sign to give the correct answer. This is then full marks. Part (c) is fin could lose 2 marks on the factorisation. (Like a misread)	e. So they	

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7. (i)	$2\log(x + a) = \log(16a^6)$, where <i>a</i> is a positive constant	
Fir	nd x in terms of a , giving your answer in its simplest form.	(2)
		(3)
(ii)	$\log_3(9y+b) - \log_3(2y-b) = 2$, where b is a positive constant	
Fir	d y in terms of b , giving your answer in its simplest form.	(4)

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Question Number	Scheme	Marks	
7. (i)	Use of power rule so $\log(x+a)^2 = \log 16a^6$ or $2\log(x+a) = 2\log 4a^3$ or $\log(x+a) = \log(16a^6)^{\frac{1}{2}}$	M1	
	Removes logs and square roots, or halves then removes logs to give $(x+a) = 4a^3$		
	Or $x^2 + 2ax + a^2 - 16a^6 = 0$ followed by factorisation or formula to give $x = \sqrt{16a^6} - a$	1111	
	$(x =) 4a^3 - a$ (depends on previous M's and must be this expression or equivalent)	A1cao (3)	
(ii) Way 1	$\log_3 \frac{(9y+b)}{(2y-b)} = 2$ Applies quotient law of logarithms	M1	
	$\frac{(9y+b)}{(2y-b)} = 3^2$ Uses $\log_3 3^2 = 2$	M1	
	$(9y+b) = 9(2y-b) \Longrightarrow y =$ Multiplies across and makes y the subject	M1	
	$y = \frac{10}{9}b$	A1cso (4)	
Way 2	Or: $\log_3(9y+b) = \log_3 9 + \log_3(2y-b)$ 2 nd M mark	M1	
	$\log_3(9y+b) = \log_3 9(2y-b)$ 1 st M mark	M1	
	$(9y+b) = 9(2y-b) \Longrightarrow y = \frac{10}{9}b$ Multiplies across and makes y the subject	M1 A1cso (4)	
	Notos	[7]	
(i)	1 st M1: Applies power law of logarithms correctly to one side of the equation M1: Correct log work in correct order. If they square and obtain a quadratic the algebra should	be	
	correct. The marks is for $x + a = \sqrt{16a^6}$ is ws allow $x + a = \pm 4a^3$ for Method mark. Also	allow	
	$x + a = 4a^4$ or $x + a = \pm 4a^{5.5}$ or even $x + a = 16a^3$ as there is evidence of attempted square	root.	
	May see the correct $x + a = 10^{(\log 4 + 3\log a)}$ so $x = -a + 10^{(\log 4 + 3\log a)}$ which gains M1A0 unless f	ollowed	
	by the answer in the scheme.		
	A1: Do not allow $x = \pm 4a^3 - a$ for accuracy mark. You may see the factorised $a(2a + 1)(2a - a)$	- 1) o.e.	
(11)	into one log term in y		
	M1: Uses $\log_3 3^2 = 2$		
	3^{rd} M1: Obtains correct linear equation in y usually the one in the scheme and attempts $y = 10$		
	Alcso: $y = \frac{10}{9}b$ or correct equivalent after completely correct work.		
	Special case: $\frac{\log_3(9y+b)}{\log_2(2y-b)} = 2 \text{ is M0 unless clearly crossed out and replaced by the correct } \log_3\frac{(9y+b)}{(2y-b)} = 2$	= 2	
	Candidates may then write $\frac{(9y+b)}{(2y-b)} = 3^2$ and proceed to the <i>correct</i> answer – allow M0M1M	1A0 as	
	the answer requires a completely correct solution. $(2y - b)$		

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8.	(a)	Show that the equation $\cos^2 x = 8\sin^2 x - 6\sin x$	Leb	ank
		can be written in the form		
		$(3\sin x - 1)^2 = 2$	(3)	
	(b)	Hence solve, for $0 \le x < 360^\circ$,		
		$\cos^2 x = 8\sin^2 x - 6\sin x$		
		giving your answers to 2 decimal places.	(5)	
22		$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	I	

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Question		S also and	Marila	
Number		Scheme	Marks	
8. (a)	Way I	Way 2 2 = $(3\sin x - 1)^2$ gives $9\sin^2 x - 6\sin x + 1 = 2$		
	$1 - \sin^2 x = 8\sin^2 x - 6\sin x$	so $\sin^2 x + 8\sin^2 x - 6\sin x + 1 = 2$	B1	
	E.g. $9\sin^2 x - 6\sin x = 1$ or			
	$9\sin^2 x - 6\sin x - 1 = 0 \text{or}$	so $8\sin^2 x - 6\sin x = 1 - \sin^2 x$	M1	
	$9\sin^2 x - 6\sin x + 1 = 2$			
	So $9\sin^2 x - 6\sin x + 1 = 2$ or			
	$(3\sin x - 1)^2 - 2 = 0$	$8\sin^2 x - 6\sin x = \cos^2 x *$	A1cso*	
	so $(3\sin x - 1)^2 = 2$ or			
	$2 = (3\sin x - 1)^2 *$		(3)	
(b)	_	Way 2: Expands $(3 \sin x - 1)^2 = 2$ and uses	(3)	
	Way 1: $(3\sin x - 1) = (\pm)\sqrt{2}$	quadratic formula on $3TQ$	M1	
	$\sin x = \frac{1 \pm \sqrt{2}}{2} \text{or} \text{awrt } 0.8047 \text{ ar}$	d = 1381	A1	
	3 of awreelood, a		10 (1 4 1	
	x = 53.58, 126.42 (or 126.41), 352.06	, 187.94	A1	
			(5)	
		Notes	[0]	
(a)	Way 1			
	B1: Uses $\cos^2 x = 1 - \sin^2 x$			
	M1: Collects $\sin^2 x$ terms to form a three term quadratic or into a suitable completed square format. May be sign slips in the collection of terms.			
	A1*: cso This needs an intermediate step from 3 term quadratic and no errors in answer and printed			
	answer stated but allow $2 = (3\sin x - 1)^{1/2}$	1) ² . If sin is used throughout instead of sinx it is A0.		
	Way 2 B1: Needs correct expansion and spli	t		
	M1: Collects $1 - \sin^2 x$ together			
	A1*: Conclusion and no errors seen			
(b)	M1: Square roots both sides(Way 1), o	r expands and uses quadratic formula (Way 2) Attempt	s at	
	factorization after expanding are M0.	d plus and minus) Need not be simplified		
	dM1: Uses inverse sin to give one of the	he given correct answers		
	1 st A1: Need two correct angles (allow though 126.42 is preferred	awrt) Note that the scheme allows 126.41 in place of 1	26.42	
	A1: All four solutions correct (Extra s	olutions in range lose this A mark, but outside range - i	gnore)	
	(Premature approximation :- in the finance)	nal three marks lose first A1 then ft other angles for se	cond A	
	Do not require degrees symbol for the	marks		
	Special case: Working in radians	14 2 20		
	witATAU IOI tile <i>correct</i> 0.94, 2.21, 6.	14, 3.20		



Mathematics C2

(4)

(2)

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9. The first three terms of a geometric sequence are

$$7k-5$$
, $5k-7$, $2k+10$

where k is a constant.

(a) Show that $11k^2 - 130k + 99 = 0$

Given that k is not an integer,

(b) show that $k = \frac{9}{11}$



(c) (i) evaluate the fourth term of the sequence, giving your answer as an exact fraction,

(ii) evaluate the sum of the first ten terms of the sequence.

(6)

Question Number	Scheme	Marks		
9. (a)	$a = 7k - 5$, $ar = 5k - 7$ and $ar^2 = 2k + 10$	B1		
	(So $r = 1$) $\frac{5k-7}{7k-5} = \frac{2k+10}{5k-7}$ or $(7k-5)(2k+10) = (5k-7)^2$ or equivalent	M1		
	See $(5k-7)^2 = 25k^2 - 70k + 49$	M1		
	$14k^{2} + 60k - 50 = 25k^{2} - 70k + 49 \rightarrow 11k^{2} - 130k + 99 = 0 *$	A1cso * (4)		
(b)	(k-11)(11k-9) so $k =$	M1		
	k = 9/11 only* (after rejecting 11) N.B. Special case $k = 9/11$ can be verified in (b) (1 mark only)	A1*		
	$11 \times \left(\frac{9}{11}\right)^2 - 130 \times \left(\frac{9}{11}\right) + 99 = \frac{81}{11} - \frac{1170}{11} + \frac{1089}{11} = 0 \text{M1A0}$	(2)		
(c)	$a = \frac{8}{11}$	B1		
	$\frac{5 \times \frac{9}{11} - 7}{7 \times \frac{9}{11} - 5} or \frac{2 \times \frac{9}{11} + 10}{5 \times \frac{9}{11} - 7} \text{ so } r = -4$	B1		
	(i) Fourth term = $ar^3 = -\frac{512}{11}$	M1A1		
	(ii) $S_{10} = \frac{a(1-r^{10})}{(1-r)} = \frac{\frac{8}{11}(1-(-4)^{10})}{(1-(-4))} = -152520$	M1A1		
		(6) [12]		
1	Notes			
 (a) Mark parts (a) and (b) together B1: Correct statement (needs all three terms)- this may be omitted and implied by correct statement in <i>k</i> only, as candidates may use geometric mean, or may use ratio of terms being equal and give a correct line 2 without line 1. (This would earn the B1M1 immediately) M1: Valid Attempt to eliminate <i>a</i> and <i>r</i> and to obtain equation in <i>k</i> only 				
M1: Corr	ect expansion of $(5k-7)^2 = 25k^2 - 70k + 49$ - may have four terms $(5k-7)^2 = 25k^2 - 35k^2$	x - 35k + 49		
 A1cso: No incorrect work seen. The printed answer is obtained including "=0". (b) M1: Attempt to solve quadratic by usual methods (factorisation, completion of square or formula – see notes at start of mark scheme) or see 9/11 substituted and given as "=0" for M1A0 A1*: 9/11 only and 11 should be seen and rejected. Accept 9/11 underlined or k= 9/11 written on following line. Alternatively (k - 11) may be seen in the factorisation and a statement 'k not integer' given with k=9/11 stated. 				
8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
B1: $a = \frac{1}{11}$ or any equivalent (If not stated explicitly or used in formula may be implied by correct answer to (ii))				
B1:Substitutes $k = 9/11$ completely and obtain $r = -4$ (If not stated explicitly, may be implied by correct answer to (i) or (ii)) (i) M1: Use of correct formula with $n = 4$ a and/or r may still be in terms of k or uses $(2k+10) \times r$. May assume $r = k$. A1: Correct exact answer				

(ii) M1: Use of correct formula with n = 10 a and/or r may still be in terms of k May assume r = k A1 : -152520 cao

NB Correct formula **with negative sign** in numerator followed by the incorrect $(8/11)(1+4^{10})/(1-(-4))$ usually found equal to 152520.2909 with no negative sign can be allowed M1A0 but if the incorrect numerical expression appears on its own with no formula then M0A0

Listing terms can get: B1 (first term) B1 M1A1 (implied by correct 4th term) M1A1 (implied by -152520)

Mathematics C2

10.

Summer 2017

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Figure 2

Figure 2 shows a sketch of part of the curve with equation

$$y = 4x^3 + 9x^2 - 30x - 8, -0.5 \le x \le 2.2$$

The curve has a turning point at the point A.

(a) Using calculus, show that the *x* coordinate of *A* is 1

The curve crosses the x-axis at the points B(2, 0) and $C\left(-\frac{1}{4}, 0\right)$

The finite region R, shown shaded in Figure 2, is bounded by the curve, the line AB, and the *x*-axis.

(b) Use integration to find the area of the finite region *R*, giving your answer to 2 decimal places.

(7)

(3)



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Question Number	Sch	eme	Marks
10. (a)	$\frac{dy}{dt} = 12x^2$	+18x - 30	M1
	Either	Or	
	Substitute $x = 1$ to give $\frac{dy}{dt} = 12 + 18 - 30 = 0$	Solve $\frac{dy}{dx} = 12x^2 + 18x - 30 = 0$ to give $x = 12x^2 + 18x - 30 = 0$	A1
	dx So turning point (all correct work so far)	dx Deduce $x = 1$ from correct work	Alcso
(b)	So turning point (an correct work so far)	Deduce $x = 1$ from correct work	(3)
Way 1	When $x = 1$, $y = 4 + 9 - 30 - 8 = -25$		B1
	Area of triangle $ABP = \frac{1}{2} \times 1 \times 25 = 12.5$ (W	Where P is at $(1, 0)$)	B1
	Way 1: $\int (4x^3 + 9x^2 - 30x - 8) dx = x^4 + \frac{9}{3}x^3 - \frac{9}{3}x^3 $	$-\frac{30x^2}{2} - 8x \{+c\} or x^4 + 3x^3 - 15x^2 - 8x \{+c\}$	M1A1
	$\left[\left[x^4 + 3x^3 - 15x^2 - 8x \right]_{-\frac{1}{4}}^1 \right] = (1 + 3 - 15 - 8) - \left(\left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 \right) = (1 + 3 - 15 - 8) - \left(\left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 \right) = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 - 8) - \left(-\frac{1}{2} + 3x^2 - 8x \right)_{-\frac{1}{4}^1}^1 = (1 + 3 - 15 -$	$-\frac{1}{4}\bigg)^{4} + 3\left(-\frac{1}{4}\right)^{3} - 15\left(-\frac{1}{4}\right)^{2} - 8\left(-\frac{1}{4}\right)\right)$	dM1
	$=(-19)-\frac{261}{256}$	or -19 - 1.02	
	So Area = " <i>their</i> 12.5" + " <i>their</i> 20 $\frac{5}{256}$ " or "?	$12.5^{\circ} + 20.02^{\circ}$ or $12.5^{\circ} + their \frac{5125}{256}$	ddM1
	= 32.52 (NOT - 32.52)	200	A1
			(7) [10]
	Less efficient alternative methods for first For first mark: Finding equation of the line A For second mark: Integrating to find triangle	t two marks in part (b) with Way 1 or 2 AB as $y = 25x - 50$ as this implies the -25 area	B1
	$\int_{1}^{2} (25x - 50) dx = \left[\frac{25}{2}x^2 - 50x\right]_{1}^{2} = -50 + 37.5 = -50$	-12.5 so area is 12.5	B1
	Then mark as before if they use Method in o	riginal scheme	
(b) Way 2	Way 2: Those who use area for original cur between line and curve between 1 and 2 h	tve between -1/4 and 2 and subtract area ave a correct (long) method .	
5	The first B1 (if $y=-25$ is not seen) is for equ	ation of straight line $y = 25x - 50$	B1
	shaped" region between line and curve, or by are	ea between line and axis/triangle found as 12.5	B1
	$\int (4x^3 + 9x^2 - 55x + 42) dx = x^4 + \frac{9}{2}x^3 - \frac{55x^2}{2}$	$+42x \{+c\}$ (or integration as in Way 1)	M1A1
	The dM1 is for correct use of the different co	prrect limits for each of the two areas: i.e.	
	$\left[x^{4} + 3x^{3} - 15x^{2} - 8x\right]_{-\frac{1}{4}}^{2} = (16 + 24 - 60 - 16) - 60 - 16$	$-\left(\left(-\frac{1}{4}\right)^{4}+3\left(-\frac{1}{4}\right)^{3}-15\left(-\frac{1}{4}\right)^{2}-8\left(-\frac{1}{4}\right)\right)$	
	And $\left[x^4 + \frac{9}{3}x^3 - \frac{55x^2}{2} + 42x\right]_1^2 = 16 + 24 - 110$	+84-(1+3-27.5+42)	dM1
	So Area = their $\left[x^4 + 3x^3 - 15x^2 - 8x\right]_{-\frac{1}{4}}^2$ min	nus their $\left[x^4 + \frac{9}{3}x^3 - \frac{55x^2}{2} + 42x \right]_1^2$	ddM1
	i.e. " <i>their</i> 37.0195" – " <i>their</i> 4.5" (with b Reaching – 32.52 (NOT – 32.52)	oth sets of limits correct for the integral)	Δ1
	See over for special case with wrong limits		

r		
	NB : Those who attempt curve – line wrongly with limits $-1/4$ to 2 may earn M1A1 for correct integration of their cubic. Usually e.g.	M1A1
	$\int (4x^3 + 9x^2 - 55x + 42) dx = x^4 + \frac{9}{3}x^3 - \frac{55x^2}{2} + 42x \{+c\}$	
	(They will not earn any of the last 3 marks) They may also get first B1 mark for the correct equation of the straight line (usually seen but may be implied by correct line –curve equation) and second B1 if they also use limits 1 and 2 to obtain 4.5 (or find the triangle area 12.5).	
(a)	Notes M1: Attempt at differentiation - all powers reduced by 1 with $8 \rightarrow 0$. A1: the derivative must be correct and uses derivative = 0 to find <i>x</i> or substitutes $x = 1$ to give 0. Ig any reference to the other root (-5/2) for this mark. A1cso: obtains $x = 1$ from correct work, or deduces turning point (if substitution used – may be im a preamble e.g. $dy/dx = 0$ at T.P.) N.B. If their factorisation or their second root is incorrect then award A0cso. If however their factorisation/roots are correct, it is not necessary for them to comment that -2.5 is	gnore plied by
	the range given.	
(b)	Way 1: B1: Obtains $y = -25$ when $x = 1$ (may be seen anywhere – even in (a)) or finds correct equation of $y = 25x - 50$ B1: Obtains area of triangle = 12.5 (may be seen anywhere). Allow –12.5. Accept $\frac{1}{2} \times 1 \times 25$	line is
	M1: Attempt at integration of cubic; two correct terms for their integration. No limits needed A1: completely correct integral for the cubic (may be unsimplified) dM1: We are looking for the start of a correct method here (dependent on previous M). It is for substituting 1 and -1/4 and subtracting. May use 2 and -1/4 and also 2 and 1 AND subtract (which equivalent) ddM1 (depends on both method marks) Correct method to obtain shaded area so adds two	ı is
	positive numbers (areas) together – one is area of triangle, the other is area of region obtained from integration of correct function with correct limits (may add two negatives then makes positive) Way 2: This is a long method and needs to be a correct method	1
	B1: Finds $y=-25$ at $x=1$, or correct equation of line is $y = 25x - 50$	
	B1: May be implied where WAY 2 is used and final correct answer obtained so award of final A1 in the award of this B1. It may also be implied by correct integration of line equation or of curve m line expression between limits 1 and 2. So if only slip is final subtraction (giving final A0, this may still be awarded) So may be implied by 4.5 seen for area of "segment shaped" region between line	results ninus rk may and
	M1: Attempt at integration of given cubic or after attempt at subtracting their line equation (no lim needed). Two correct terms needed	iits
	A1: Completely correct integral for their cubic (may be unsimplified) – may have wrong coeffic x and wrong constant term through errors in subtraction dM1: Use limits for original curve between -1/4 and 2 and use limits of 1 and 2 for area between	ients of een line
	and curve– needs completely correct limits– see scheme- this is dependent on two integrations ddM1: (depends on both method marks) Subtracts " <i>their</i> 37.0195"–" <i>their</i> 4.5" Needs consist signs.	ency of
	A1: 32.52 or awrt 32.52 e.g. $32\frac{133}{256}$ NB: This correct answer implies the second B mark	
	(Trapezium rule gets no marks after first two B marks) The first two B marks may be given w seen. The integration of a cubic gives the following M1 and correct integration of their cubic	herever
	$\int (4x^3 + 9x^2 + Ax + B)dx = x^4 + \frac{9}{3}x^3 + \frac{Ax^2}{2} + Bx \{+c\} \text{ gives the A1}$	