

Mathematics B (MEI)

General Certificate of Secondary Education

Unit **B293**: Paper 3 (Higher – Modular)

Mark Scheme for January 2011

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2011

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Section A

1	(a)	17	2	M1 $\frac{51}{300}$ soi	
	(b)	50	2	M1 divide 300 by 6 or 250:50	
2	(a)	Either odd or even $5n$ could be odd or even and therefore so could $5n + 1$ oe	2	B1 for 'either odd or even' with incomplete reason	Accept the sub of two values to give an odd answer and an even answer for B2
	(b)	Always even Multiple of 2	2	B1 for 'always even' with incomplete reason	oe eg an even number (or 2) x any number is even 1 example, odd and 1 even is incomplete
3		700×0.05 oe £35 So an increase of £40 is better.	M1 A1 A1	35 or 735 implies M1A1	M0 for no working seen
4		Sight of 0.8 or 0.6 or 0.5 $\frac{96 \text{ or } 100}{\dots}$ oe 0.48 or 0.5 or 0.4 Correct ans from their approximation	M1 A1 A1	Soi by 0.48 dep on M1A1	
5		$x = 28^\circ$ Exterior angle of triangle = sum of interior opposite angles oe $y = 114^\circ$ (Co-)interior or allied angles or corresponding angles	B1 B1 B1 B1		Or equivalent – ie angles on a straight line Then angle sum of triangle (=180)

6	(a)	2	3	M1 for $6x + 15 = 27$ or $2x + 5 = 9$ M1 for resolving to $ax = b$	Resolution of brackets
	(b)	Multiplying to equalise coefficients Add or subtract appropriately $x = 3$ $y = -2$	M1 M1 A1 A1	If 0 scored, SC1 for $x = 3, y = -2$ without algebraic support,	
7		2.2	4	M1 for ratio of sides attempted A1 for $\frac{x}{5} = \frac{(3.5 - 2.4)}{(3.5 - 1)}$ oe M1 (dep on 1 st M1) for correct method of solution. If 0 scored SC1 for 1.1 seen.	Or equivalent Accept "Length of beam is double height to vertex", so new beam will be $1.1 \times 2 = 2.2$
8	(a)	$\frac{23}{200}$ oe	1	eg 0.115, ISW an attempt to change form of the answer or to round answer	
	(b)	Jake We would expect roughly equal numbers for each number, but 23 is too low (or 51 is too high)	B1	B1 for Jake with incomplete reason	
9	(a)	$x(x - 2)$	1		
	(b)	$\frac{x-3}{x}$ WWW final answer	3	M1 for attempt to factorise top A1 top correct and ft their (a)	$(x \pm 2)(x \pm 3)$ or $(x \pm 1)(x \pm 6)$

10	(a)	Fred: 73 Jo: 57	B1 B1		Must be a comparison Average can be median or mean
	(b)	Any 2 of: Fred higher average Fred wider spread Fred more trees/more apples/data/ tree with max apples oe	1 + 1		
11	(a)	0.6 oe	2	ISW an attempt to change form of the answer, M1 for $\frac{16+13+7}{60}$	Accept <i>their</i> 60 if they clearly add $24 + 16 + 13 + 7$
	(b)	57.75	4	M2 for $52.5 \times 24 + 57.5 \times 16 + \dots$ soi by 3465 Or M1 for above with other consistent value in interval +M1 (dep on at least M1) for $\div 60$	
12	(a)	Mark at approx (1.3, 2)	1	Within half a square	f(1.3)=1.897 < 2, f(1.4) = 2.344 > 2 f(1.32) = 1.98 < 2, f(1.33) = 2.02 > 2 f(1.325) > 2
	(b)	Trials to show root in range [1.3, 1.4] Trials to show root in range [1.32, 1.33] Trial to find which end - 1.32	M1 A1 A1		
13		50	3	M1 for $\frac{DC+40}{2} \times 70$ oe M1 for equating their area to 3150	Equiv method M1 for $3150 - 70 \times 40$ M1 for $\frac{350}{70} \times 2$

14		24.6° ignore subsequent rounding	3	<p>M2 for $\sin^{-1} \frac{25}{60}$ oe</p> <p>Or M1 for $\sin \theta = \frac{25}{60}$ oe</p> <p>If 0 scored, SC1 for 65.4, 65 or 66</p>	<p>following M1, \sin^{-1} can be implied by angle between 24 and 25</p> <p>Accept 25 following</p>
15	(a)	(8, 4, 2)	1		
	(b)	9.16 to 9.17 (km)	3	<p>M2 for attempt at 3-D Pythagoras or 2 applications of 2-D Pythagoras</p> <p>M1 for attempt at 2-D Pythagoras</p>	
	(c)	X in correct position at midpoint of DE	1		
16	(a)	4 (6) 7 8 6	2	B1 for one error	
	(b)	Scale consistent with labelling	2	B1 one error	eg labelling 2, 4, 6, scale 10 cm or 0.2, 0.4, 0.6 scale 1 cm
17	(a)	$c = 3, d = 1$	3	<p>M1 Attempt to complete square</p> <p>A1 for either $c = 3$ or $d = 1$</p> <p>Or B1 for $x^2 - 2cx + c^2 + d$</p> <p>+ B1 for $c = 3$ + B1 for $d = 1$</p>	i.e. $(x - 3)^2 + \text{anything}$
	(b)	1	1	ft their d	
18		11 WWW	3	<p>M1 for 1450 or 125 seen</p> <p>M1 for $\frac{\text{small } 1500}{\text{large } 120}$</p>	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2011

