## **CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education** 

## MARK SCHEME for the May/June 2013 series

## 0580 MATHEMATICS

0580/22

Paper 2 (Extended), maximum raw mark 70

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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## **Abbreviations**

cao correct answer only cso correct solution only

dep dependent

ft follow through after error isw ignore subsequent working

oe or equivalent SC Special Case

www without wrong working

soi seen or implied

•	1.	24.1	D (37 )
Qu	Answers	Mark	Part Marks
1	B	1	
	B	1	
2	(p+3)(k+m)	2	<b>B1</b> for $k(p+3) + m(p+3)$ or $p(k+m) + 3(k+m)$
3	17 – 4n	2	<b>B1</b> for $\pm 4n$ seen
4	$4.55 \times 10^8$	2	<b>B1</b> for figs 455 seen
5	10.5 www	2	<b>M1</b> for $42 = \frac{1}{2} \times BC \times 8$ or better
6	2.2[0]	2	<b>M1</b> for 11.99 ÷ 0.626 soi by 19.2 or 19.15
7 (a)	5.17225	1	
(b)	5.2	1FT	FT their (a)
8	6.1 final answer	2	<b>M1</b> for $[\sqrt{37.8225}]$ 6.15
9	<b>40.3</b> or 40.31 to 40.32	3	<b>M2</b> for $4.4 \times \sqrt[3]{\frac{0.05}{65}}$ soi
			or M1 for $\sqrt[3]{\frac{0.05}{65}}$ soi or $\sqrt[3]{\frac{65}{0.05}}$ soi
10 (a)	95	1	
(b)	77	2	<b>B1</b> for [angle] $ACD = 58^{\circ}$ or [angle] $BAC = 19^{\circ}$ or [angle] $ANB = 103^{\circ}$ or [angle] $CAE = 66^{\circ}$

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Qu	Answers	Mark	Part Marks
11	with 2 correct steps seen $\frac{18k}{35k}$	3	<b>B1</b> for $\frac{5k}{3k}$ and <b>M1</b> for $\frac{6}{7} \times their \frac{3}{5}$
12	14.5 oe	3	M2 for complete correct method or M1 for one correct step
13	6632.55 cao final answer	3	<b>M2</b> for $6250 \times (1 + \frac{2}{100})^3$ oe
			<b>or M1</b> for $6250 \times (1 + \frac{2}{100})^2$ oe
			SC2 for answer 382.55 final answer
14	0.625 oe	3	<b>M1</b> for $y = \frac{k}{r^3}$
			<b>A1</b> for $k = 40$
15	$\frac{-7 \pm \sqrt{7^2 - 4(2)(-3)}}{2 \times 2}$	B2	<b>B1</b> for $\sqrt{7^2 - 4(2)(-3)}$ or better seen
	2×2		<b>B1</b> for $p = -7$ and $r = 2 \times 2$ or better
			as long as in the form $\frac{p+\sqrt{q}}{r}$ or
			$\frac{p - \sqrt{q}}{r}$
	0.39, -3.89 cao	B1,B1	After <b>B0B0</b> for the two answers, <b>SC1</b> for 0.4 or 0.386[0009]
			and -3.9 or -3.886[0009] or <b>SC1</b> for -0.39 and 3.89
16	15	4	<b>M2</b> for $\frac{1}{2} \times 40 \times (26 + 19)$ oe
			or <b>M1</b> for one valid area calculation
			Indep M1 for ÷ 60
			SC3 for answer 900
17 (a)	7 correct plots	2	P1 for 5 or 6 correct
(b)	Negative	1	
(c)	ruled line of best fit within tolerance	1	

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Qu		Answers	Mark	Part Marks
18		-1 -2 -3 -4	4	<b>B3</b> for $x < -\frac{3}{5}$ and $x > -4.5$ oe or <b>B2</b> for $x < -\frac{3}{5}$ or $x > -4.5$ oe or <b>B1</b> for $5x < -3$ or $-9 < 2x$ oe Or mark on answer line $-1$ oe
19	(a)	arc centre A radius 5 cm	2	<b>B1</b> arc with centre A
	(b)	ruled perpendicular bisector of <i>DB</i> with 2 pairs of correct arcs	2	B1 correct ruled line B1 2 pairs of correct arcs
	(c)	cao	1	
20	(a)	$10 < h \le 13$	1	
	(b)	12.1[2] www	4	M1 for at least 5 correct mid-values seen
				M1 for $\sum fx$ where x is in the correct interval
	(c)	70, 115, 153, 185, 200	2	M1 for their $\sum fx \div 200$
				<b>B1</b> for 3 or 4 correct
21	(a)	4.5 oe	2	<b>B1</b> for $[g(5)=]$ 0.1 oe
	(b)	x	2	M1 for $\frac{1}{2(\frac{1}{2x})}$ seen oe
	(c)	$\frac{x-4}{5}$ oe	2	M1 for a correct first step
	(d)	- 3	2	e.g. $y - 4 = 5x$ or $\frac{y}{5} = x + \frac{4}{5}$ or $x = 5y + 4$ M1 for $\left(\frac{1}{2}\right)^{-3} = 8$ or $\left(\frac{1}{2}\right)^{x} = \left(\frac{1}{2}\right)^{-3}$ or $2^{x} = \frac{1}{8}$ oe or $2^{-x} = 2^{3}$