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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Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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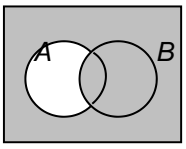
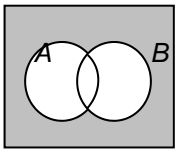
Abbreviations

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

Qu	Answers	Mark	Part Marks
1		**1**	
		**1**	
2	$(p + 3)(k + m)$	**2**	**B1** for $k(p + 3) + m(p + 3)$ or $p(k + m) + 3(k + m)$
3	$17 - 4n$	**2**	**B1** for $\pm 4n$ seen
4	4.55×10^8	**2**	**B1** for figs 455 seen
5	10.5 www	**2**	**M1** for $42 = \frac{1}{2} \times BC \times 8$ or better
6	2.2[0...]	**2**	**M1** for $11.99 \div 0.626$ 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**	**M1** for [$\sqrt{37.8225}$=] 6.15
9	**40.3** or 40.31 to 40.32	**3**	**M2** 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**	**B1** for [angle] $ACD = 58°$ or [angle] $BAC = 19°$ or [angle] $ANB = 103°$ or [angle] $CAE = 66°$

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Qu	Answers	Mark	Part Marks
11	with 2 correct steps seen $\frac{18k}{35k}$	**3**	**B1** for $\frac{5k}{3k}$ and **M1** 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**	**M2** for $6250 \times (1+\frac{2}{100})^3$ oe **or M1** for $6250 \times (1+\frac{2}{100})^2$ oe **SC2** for answer 382.55 final answer
14	0.625 oe	**3**	**M1** for $y=\frac{k}{x^3}$ **A1** for $k=40$
15	$\frac{-7\pm\sqrt{7^2-4(2)(-3)}}{2\times 2}$ 0.39, –3.89 cao	**B2** **B1,B1**	**B1** for $\sqrt{7^2-4(2)(-3)}$ or better seen **B1** for $p=-7$ and $r=2\times 2$ or better as long as in the form $\frac{p+\sqrt{q}}{r}$ or $\frac{p-\sqrt{q}}{r}$ After **B0B0** for the two answers, **SC1** for 0.4 or 0.386[0009...] and –3.9 or –3.886[0009...] or **SC1** for −0.39 and 3.89
16	15	**4**	**M2** for $\frac{1}{2}\times 40\times(26+19)$ oe or **M1** 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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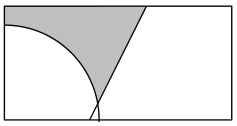
Qu		Answers	Mark	Part Marks
18		-1 -2 -3 -4	**4**	**B3** for $x < -\frac{3}{5}$ and $x > -4.5$ oe or **B2** for $x < -\frac{3}{5}$ or $x > -4.5$ oe or **B1** for $5x < -3$ or $-9 < 2x$ oe Or mark on answer line -1 oe
19	**(a)**	arc centre A radius 5 cm	**2**	**B1** arc with centre A
	(b)	ruled perpendicular bisector of DB with 2 pairs of correct arcs	**2**	**B1** correct ruled line **B1** 2 pairs of correct arcs
	(c)	cao 	**1**	
20	**(a)**	$10 < h \leq 13$	**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 $\sum fx \div 200$ **B1** for 3 or 4 correct
21	**(a)**	4.5 oe	**2**	**B1** for [g(5)=] 0.1 oe
	(b)	x	**2**	**M1** for $\frac{1}{2\left(\frac{1}{2x}\right)}$ seen oe
	(c)	$\frac{x-4}{5}$ oe	**2**	**M1** for a correct first step e.g. $y - 4 = 5x$ or $\frac{y}{5} = x + \frac{4}{5}$ or $x = 5y + 4$
	(d)	-3	**2**	**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 $2^{-x} = 2^{3}$

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