Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/22**

Paper 2 (Extended) **May/June 2017**

MARK SCHEME

Maximum Mark: 70

Published

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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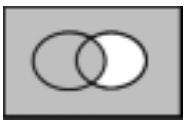
Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Part Marks
1	[0].072	**1**	
2	[0].15 oe	**1**	
3	[0].62	**1**	
4	[0].394 or [0].3944 to [0].3945	**1**	
5	41.9 or 41.87	**1**	
6	$7(2x – 3y)$ final answer	**1**	
7	41	**2**	**M1** for $5(7) – 3(–2)$
8	110	**1**	
	70	**1**	
9	$\frac{5}{6} – \frac{3}{6}$ oe	**M1**	oe for $\frac{5k}{6k} – \frac{3k}{6k}$
	$\frac{1}{3}$ cao final answer	**A1**	
10	$\frac{1}{6}$ oe	**2**	**M1** for $2 – 1 = 5x + x$ oe
11(a)	6.05×10^{-2}	**1**	
11(b)	5.1×10^{3}	**1**	
12	34.8 or 34.84 to 34.85	**2**	**M1** for sin [=] $\frac{4}{7}$
13	$n < 3.5$ oe final answer	**2**	**M1** for $18 – 11 > 5n – 3n$ oe
14(a)	25	**1**	
14(b)	9	**1**	

Question	Answer	Marks	Part Marks
15	$[\pm]\sqrt{\frac{p}{2}}$ oe	**2**	**M1** for $\frac{p}{2} = q^2$ or $\sqrt{p} = \sqrt{2}\,q$ or $[q =]$ $\sqrt{their\ \frac{p}{2}}$ or $[q =]$ $\frac{\sqrt{p}}{their\sqrt{2}}$
16(a)	Correct bisector with correct arcs	**2**	**B1** for correct bisector but no arcs or correct arcs but no line
16(b)	Correct region shaded	**1**	
17	4.34 or 4.336 to 4.337	**3**	**M2** for $\frac{8.15\sin 30}{\sin 110}$ or **M1** for $\frac{\sin 110}{8.15} = \frac{\sin 30}{AC}$ oe
18	2859.75 2968.75 cao final answer	**3**	**B2** for one correct seen or **B1** for 62.5 or 61.5 or 46.5 or 47.5 seen or **M1** for (62 + 0.5) × (47 + 0.5) or (62 – 0.5) × (47 – 0.5)
19	37.4 or 37.38… and 142.6 or 142.6…	**3**	**B2** for one correct or **M1** for 0.5 × 8 × 7 sin = 17 oe If zero or **M1** only scored, **SC1** for two answers with a sum of 180
20	$\frac{2x^2+x-7}{3(x+1)}$ or $\frac{2x^2+x-7}{3x+3}$ final answer	**3**	**M1** for $(2x – 1)(x + 1) – 2 \times 3$ oe with an attempt to expand the brackets **B1** for $3(x + 1)$ or $3x + 3$ for denominator
21	1.5 or $\frac{3}{2}$ or $1\frac{1}{2}$	**3**	**M1** for $\frac{k}{\sqrt{1+x}}$ **M1** for $y = \frac{their\ k}{\sqrt{1+15}}$ or **M2** for $\frac{2}{\sqrt{1+15}} = \frac{y}{\sqrt{1+8}}$
22(a)	$(3t+u)(3t-u)$ final answer	**2**	**B1** for $(at + bu)(ct + du)$ final answer where $ac = 9$ or $ad + bc = 0$ or $bd = -1$
22(b)	$(c-2d)(2-p)$ or $(p-2)(2d-c)$ final answer	**2**	**M1** for $2(c-2d) - p(c-2d)$ or $c(2-p) - 2d(2-p)$ or $p(2d-c) - 2(2d-c)$ or $2d(p-2) - c(p-2)$
23(a)(i)	24	**1**	
23(a)(ii)	5	**1**	

Question	Answer	Marks	Part Marks
23(a)(iii)	$\frac{7}{12}$	**1**	
23(b)		**1**	
24(a)	Similar	**1**	
24(b)	5.6	**2**	**M1** for $\frac{4}{8}=\frac{2.8}{AX}$ oe
24(c)	$\frac{y}{4}$ oe	**1**	
25(a)	$8x^{12}$ final answer	**2**	**B1** for $8x^k$ or kx^{12} in final answer $k \neq 0$
25(b)	9	**2**	**M1** for $27^{\frac{2}{3}}$ or 3^k or $p^{\frac{1}{2}}=3$ or $p^3=729$
26	[w =] 40	**1**	
	[x =] 95	**2**	**B1** for angle ABC = 85 or *their* w + *their* CBD = 85
	[y =] 45	**2**	**B1** for angle CBD = 45 or angle ACD = 40 or angle ACD = *their* w or y = *their* CBD
27(a)	$y = 2x + 4$	**3**	**B2** for $2x + 4$ or $y = 2x + c$ or $y = mx + 4$ or **B1** for $2x + c$ or for $kx + 4$ or **M1** for rise/run
27(b)	$y=-\frac{1}{2}x+\frac{3}{2}$ oe	**4**	**B1** for (–1, 2) **M1** for the gradient $-\frac{1}{2}$ oe or $\frac{-1}{\textit{their } 2}$ oe **M1** for substituting *their* (–1, 2) into *their* $y = mx + c$ oe