

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2014 series**

### **0580 MATHEMATICS**

**0580/21**

Paper 2 (Extended), maximum raw mark 70

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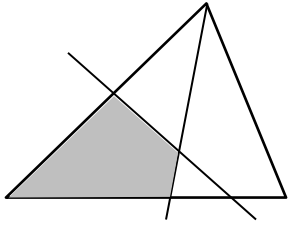
<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – October/November 2014</b>	<b>0580</b>	<b>21</b>

### Abbreviations

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

Qu.	Answers	Mark	Part Marks
<b>1</b>	8.1722 cao	<b>2</b>	<b>B1</b> for 8.17 or 8.172 or 8.1721 or 8.17215...
<b>2</b>	3 3.14 $\pi$ 3.142 $\frac{22}{7}$	<b>2</b>	<b>B1</b> for 3.141[5...] to 3.1416 <b>and</b> 3.1428 to 3.1429 or 3.143 seen or <b>SC1</b> for 4 in correct order
<b>3 (a)</b>	E B A cao	<b>1</b>	
<b>(b)</b>	Z cao	<b>1</b>	
<b>4 (a)</b>	−3	<b>1</b>	
<b>(b)</b>	4	<b>1FT</b>	FT their numerical mode
<b>5</b>	$\frac{3}{12}$ and $\frac{2}{12}$ $\frac{5}{12}$ cao	<b>M1</b> <b>A1</b>	Equivalent denominators can be used, working <b>must</b> be shown.
<b>6 (a)</b>	15.1 cao	<b>1</b>	
<b>(b)</b>	20 cao	<b>1</b>	
<b>7</b>	2.5[0] or 2.501... nfw	<b>3</b>	<b>M2</b> for $2.1 \times \left(1 + \frac{6}{100}\right)^3$ oe or <b>M1</b> for $2.1 \times \left(1 + \frac{6}{100}\right)^n$ oe where $n \geq 2$ or for figs $21 \times \left(1 + \frac{6}{100}\right)^3$ oe
<b>8</b>	0.29 cao	<b>3</b>	<b>M2</b> for $30 - (24 \times 1.2378)$ or $(24 \times 1.2378) - 30$ or <b>M1</b> for $24 \times 1.2378$
<b>9 (a)</b>	280	<b>1</b>	
<b>(b)</b>	$5 \times 10^6$	<b>2</b>	<b>B1</b> for 5 000 000 oe or <b>B1</b> for answer $k \times 10^6$ or $5 \times 10^k$

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0580	21

10	3.75 oe	3	M2 for $3 \times 5 = 7x - 3x$ oe or M1 for $3(x + 5) = 7x$ or $x + 5 = \frac{7}{3}x$ or $1 + \frac{5}{x} = \frac{7}{3}$ or better
11 (a)	$x^6$	1	
(b)	$\frac{x^2}{3}$	2	B1 for answer $kx^2$ or $\frac{x^k}{3}$ or $\frac{1}{3}$
12	5 -5 nfw	3	M1 for correctly eliminating one variable A1 for $x = 5$ A1 for $y = -5$  If zero scored SC1 for correct substitution and evaluation to find the other variable
13	$[\pm] 8$ nfw	3	M1 for $y = k\sqrt{x+5}$ A1 for $k = [\pm] 2$ or M2 for $\frac{4}{\sqrt{-1+5}} = \frac{y}{\sqrt{11+5}}$ oe
14	$\begin{pmatrix} 4 & 16 \\ 2 & 8 \end{pmatrix}$	3	M2 for $\begin{pmatrix} 12 & 48 \\ 6 & 24 \end{pmatrix}$ and $\begin{pmatrix} 8 & 32 \\ 4 & 16 \end{pmatrix}$ or M1 for $\begin{pmatrix} 12 & 48 \\ 6 & 24 \end{pmatrix}$ or for $\begin{pmatrix} 8 & 32 \\ 4 & 16 \end{pmatrix}$
15 (a) (i)		2	B2 for correct ruled bisector with correct arcs or B1 for correct bisector with no/incorrect arcs
(ii)		2	B2 for correct ruled bisector with correct arcs or B1 for correct bisector with no/incorrect arcs
(b)		1	correct shading
16	142 or 142.0...	5	B1 for $CBD = 30$ M2 for $[\sin D =] \frac{6 \times \sin \text{their} B}{8}$ oe or M1 for $\frac{6}{\sin D} = \frac{8}{\sin(\text{their} 30)}$ oe A1 for $[D =] 22$ or 22.0 or 22.02... B1FT for $90 + (\text{their} 30 + \text{their} 22)$ evaluated correctly for their final answer or for $360 - 90 - \text{their} BCD$ evaluated correctly for their final answer

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0580	21

17	890 or 890.1 to 890.2...	5	<p><b>M4</b> for <math>\frac{1}{2} \times \left( \frac{4}{3} \times \pi \times 5^3 \right) + \pi \times 5^2 \times 8</math></p> <p>or <b>M3</b> for <math>\frac{1}{2} \times \left( \frac{4}{3} \times \pi \times 5^3 \right)</math> and <math>\pi \times 5^2 \times 8</math></p> <p>or <b>M2</b> for <math>\frac{1}{2} \times \left( \frac{4}{3} \times \pi \times 5^3 \right)</math> or <math>\pi \times 5^2 \times 8</math></p> <p>or <b>M1</b> for <math>\frac{4}{3} \times \pi \times 5^3</math></p>
18 (a)	0.6 0.2 0.8 in correct places	2	<p><b>B1</b> for 0.6 in correct place</p> <p><b>B1</b> for 0.2 and 0.8 in correct places</p>
(b)	0.52 oe nfw	3	<p><b>M2FT</b> for <math>1 - (\text{their } 0.6 \times \text{their } 0.8)</math> oe</p> <p>or <b>M1FT</b> for a correct product from <i>their</i> tree in (a)</p>
19 (a)	CBA and BDA are equilateral oe	1	
(b)	67[.0] or 67.02 to 67.03	2	<p><b>M1</b> for <math>\frac{120}{360} \times \pi \times 8^2</math> oe</p>
(c) (i)	39.3 or 39.28 to 39.33	3	<p><b>M2FT</b> for <math>\text{their}(b) - \frac{1}{2} \times 8^2 \times \sin 120</math> oe</p> <p>or <b>M1</b> for <math>\frac{1}{2} \times 8^2 \times \sin 120</math> oe</p>
(ii)	78.6 or 78.7 or 78.56 to 78.66	1FT	<p><b>FT</b> <math>2 \times \text{their}(c)(i)</math> correctly evaluated</p>
20 (a)	0.4 or $\frac{2}{5}$	2	<p><b>B1</b> for <math>[f(2) =] 4</math></p> <p>or <b>M1</b> for <math>\frac{2}{(3x-2)+1}</math> or better</p>
(b)	-0.8 or $-\frac{4}{5}$	2	<p><b>M1</b> for <math>2 = 10(x+1)</math> or better</p>
(c)	$3x - 6$ or $3(x-2)$ nfw	3	<p><b>M2</b> for <math>3(2x) - 2 - (3(x+2) - 2)</math></p> <p>or <b>M1</b> for <math>[f(2x) =] 3(2x) - 2</math> or <math>[f(x+2)] = 3(x+2) - 2</math></p>