

**MARK SCHEME for the May/June 2014 series**

**0580 MATHEMATICS**

**0580/21**

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
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	Answers	Mark	Part Marks
<b>1</b>	1.37	<b>2</b>	<b>B1</b> for 0.866... or $\frac{\sqrt{3}}{2}$ or 0.5 or $\frac{1}{2}$ or <b>B1</b> for 1.366... as final answer
<b>2</b>	$18\frac{1}{18}$	<b>2</b>	<b>M1</b> for $\frac{2}{36} + \frac{36}{2}$ or better
<b>3</b>	30	<b>2</b>	<b>M1</b> for $n - 8 = 22$ or $\frac{n}{2} = 15$
<b>4 (a)</b>	$\frac{5 \times 2}{20}$	<b>1</b>	
<b>(b)</b>	0.5 or $\frac{1}{2}$ cao	<b>1</b>	
<b>5</b>	$0.5^3$ $0.5^2$ $0.5$ $\sqrt[3]{0.5}$	<b>2</b>	<b>B1</b> for 0.25 , 0.125 and 0.793... seen or for three in correct order
<b>6</b>	1.6[0]	<b>3</b>	<b>M1</b> for $800 \times 1.5$ and <b>M1</b> for <i>their</i> $1200 \div 750$
<b>7</b>	$4 \pm \sqrt{y-6}$	<b>3</b>	<b>M1</b> for <i>their</i> 6 moved correctly <b>M1</b> for <i>their</i> $\sqrt{\quad}$ taken correctly <b>M1</b> for <i>their</i> 4 moved correctly
<b>8</b>	$\frac{2}{x(x+1)}$	<b>3</b>	<b>B1</b> for common denominator $x(x+1)$ seen <b>M1</b> for $2(x+1) - 2x$ oe or better
<b>9 (a)</b>	119	<b>3</b>	<b>M2</b> for $18 \times 6 + 11$ oe or <b>B1</b> for 18 or 11 or 108
<b>(b)</b>	[0] 1 [00] pm cao	<b>1</b>	
<b>10 (a)</b>	$(a+b)(x+y)$	<b>2</b>	<b>B1</b> for $a(x+y) + b(x+y)$ or $x(a+b) + y(a+b)$
<b>(b)</b>	$(x-1)(3x-2)$	<b>2</b>	<b>B1</b> for $(x-1)(3(x-1)+1)$ If <b>B0</b> then <b>SC1</b> for $(x+a)(3x+b)$ where $3a+b = -5$ or $ab = 2$ or $3(x-1)(x-\frac{2}{3})$

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11	113.9 to 114.0	4	<p><b>M2</b> for <math>[\cos =] \frac{8^2 + 2^2 - 9^2}{2 \times 8 \times 2}</math>  or <b>M1</b> for <math>9^2 = 8^2 + 2^2 - 2 \times 8 \times 2 \times \cos x</math></p> <p><b>A1</b> for <math>-0.406</math> or <math>-0.4063</math> to <math>-0.4062</math> or <math>-\frac{13}{32}</math></p> <p>If <b>0</b> scored <b>SC2</b> for 54.3[1...] or 11.7 or 11.71 to 11.72</p> <p><b>SC1</b> for <math>[\cos =] \frac{9^2 + 2^2 - 8^2}{2 \times 9 \times 2}</math> or  <math>[\cos =] \frac{9^2 + 8^2 - 2^2}{2 \times 9 \times 8}</math></p>
12 (a)	$2 \times 10^{10}$	2	<b>B1</b> for $20 \times 10^9$ or 20 000 000 000
(b)	$1.25 \times 10^{-1}$	2	<b>B1</b> for 0.125 oe
13 (a)	32	2	<b>B1</b> for $AOC = 116$
(b)	35	2	<b>B1</b> for $CDA = 122$
14	$y = \frac{2}{3}x - 2$ oe	4	<p><b>B1</b> for (9, 4)  and</p> <p><b>M2</b> for <math>y = kx - 2</math> (<math>k \neq 0</math>) or <math>y = \frac{2}{3}x + k</math> (<math>k \neq 0</math>) or  <math>\frac{2}{3}x - 2</math></p> <p>or <b>M1</b> for <math>y = \frac{2}{3}x</math> or <math>\frac{2}{3}x + k</math> (<math>k \neq 0</math>)</p>
15	[0], 1, 2, 3	4	<p><b>M1</b> for moving the 5 correctly  <b>M1</b> for collecting <i>their</i> terms  <b>A1</b> for a correct inequality for <math>x</math> eg <math>[0 \leq] x &lt; 4</math></p>
16 (a)	8	2	<b>B1</b> for $2^{12}$ or 4096
(b)	$2q^{\frac{3}{2}}$	3	<p><b>B2</b> for <math>kq^{\frac{3}{2}}</math> as the answer  or</p> <p><b>B1</b> for <math>2q^2</math> and <b>B1</b> for <math>q^{\frac{1}{2}}</math> oe nfw</p>
17 (a)	correct working	2	<p><b>M1</b> for 1 holiday = 5 or <math>360 \div 72 = 5</math>  and <b>B1</b> for <math>24 \times 5 [= 120]</math>  or</p> <p><b>M2</b> for <math>\frac{24}{72} \times 360 [= 120]</math> oe</p>
(b)	6 nfw	3	<p><b>M1</b> for <math>150 + 120 + x + 2x = 360</math> oe  <b>A1</b> for 30 identified as the required angle</p>
18 (a)	correct working	2	<p><b>B2</b> for <math>\sqrt[3]{\frac{1}{8}} = \frac{1}{2}</math> or <math>\sqrt[3]{8} = 2</math> AND <math>\frac{10}{2} = 5</math> oe and <math>\frac{4}{2} = 2</math>  oe  or</p> <p><b>B1</b> for <math>\sqrt[3]{\frac{1}{8}}</math> or <math>\sqrt[3]{8}</math> or <math>8 = 2^3</math> or <math>\frac{1}{8} = (\frac{1}{2})^3</math></p>

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<b>(b)</b>	147 or 146.5 to 146.6...	<b>4</b>	<p><b>M3</b> for <math>\frac{7}{8} \times \frac{1}{3} \times \pi \times 4^2 \times 10</math> or</p> <p><b>M1</b> for <math>\frac{1}{3} \times \pi \times 4^2 \times 10</math> and</p> <p><b>M1</b> for <math>\frac{1}{3} \times \pi \times 2^2 \times 5</math> and</p> <p><b>M1</b> for subtracting <i>their</i> volumes</p>
<b>19</b>	1.38 or 1.39 or 1.384 to 1.389	<b>7</b>	<p><b>M3</b> [Area <math>\Delta</math> =] <math>\frac{1}{2} \times 8 \cos 60 \times 8 \sin 60</math> or <b>M1</b> for [ <math>AE</math> =] <math>8 \cos 60</math> and <b>M1</b> for [ <math>ED</math> ] = <math>8 \sin 60</math> and</p> <p><b>M1</b> for Area sector <math>\frac{30}{360} \times \pi \times 8^2</math> and</p> <p><b>M1</b> for Area rectangle = <math>8 \times 8 \cos 60</math> or <math>8 \times 4</math> <b>M1</b> for <i>their</i> <math>32 - (\text{their } 13.86 + \text{their } 16.76)</math> or better</p>