

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
1	1.37	2	B1 for 0.866... or $\frac{\sqrt{3}}{2}$ or 0.5 or $\frac{1}{2}$ or B1 for 1.366... as final answer
2	$18\frac{1}{18}$	2	M1 for $\frac{2}{36} + \frac{36}{2}$ or better
3	30	2	M1 for $n - 8 = 22$ or $\frac{n}{2} = 15$
4 (a)	$\frac{5 \times 2}{20}$	1	
(b)	0.5 or $\frac{1}{2}$ cao	1	
5	0.5^3 0.5^2 0.5 $\sqrt[3]{0.5}$	2	B1 for 0.25 , 0.125 and 0.793... seen or for three in correct order
6	1.6[0]	3	M1 for 800×1.5 and M1 for <i>their</i> $1200 \div 750$
7	$4 \pm \sqrt{y-6}$	3	M1 for <i>their</i> 6 moved correctly M1 for <i>their</i> $\sqrt{\quad}$ taken correctly M1 for <i>their</i> 4 moved correctly
8	$\frac{2}{x(x+1)}$	3	B1 for common denominator $x(x+1)$ seen M1 for $2(x+1) - 2x$ oe or better
9 (a)	119	3	M2 for $18 \times 6 + 11$ oe or B1 for 18 or 11 or 108
(b)	[0] 1 [00] pm cao	1	
10 (a)	$(a+b)(x+y)$	2	B1 for $a(x+y) + b(x+y)$ or $x(a+b) + y(a+b)$
(b)	$(x-1)(3x-2)$	2	B1 for $(x-1)(3(x-1)+1)$ If B0 then SC1 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>M2 for $[\cos =] \frac{8^2 + 2^2 - 9^2}{2 \times 8 \times 2}$ or M1 for $9^2 = 8^2 + 2^2 - 2 \times 8 \times 2 \times \cos x$</p> <p>A1 for -0.406 or -0.4063 to -0.4062 or $-\frac{13}{32}$</p> <p>If 0 scored SC2 for 54.3[1...] or 11.7 or 11.71 to 11.72</p> <p>SC1 for $[\cos =] \frac{9^2 + 2^2 - 8^2}{2 \times 9 \times 2}$ or $[\cos =] \frac{9^2 + 8^2 - 2^2}{2 \times 9 \times 8}$</p>
12 (a)	2×10^{10}	2	B1 for 20×10^9 or 20 000 000 000
(b)	1.25×10^{-1}	2	B1 for 0.125 oe
13 (a)	32	2	B1 for $AOC = 116$
(b)	35	2	B1 for $CDA = 122$
14	$y = \frac{2}{3}x - 2$ oe	4	<p>B1 for (9, 4) and</p> <p>M2 for $y = kx - 2$ ($k \neq 0$) or $y = \frac{2}{3}x + k$ ($k \neq 0$) or $\frac{2}{3}x - 2$</p> <p>or M1 for $y = \frac{2}{3}x$ or $\frac{2}{3}x + k$ ($k \neq 0$)</p>
15	[0], 1, 2, 3	4	<p>M1 for moving the 5 correctly M1 for collecting <i>their</i> terms A1 for a correct inequality for x eg $[0 \leq] x < 4$</p>
16 (a)	8	2	B1 for 2^{12} or 4096
(b)	$2q^{\frac{3}{2}}$	3	<p>B2 for $kq^{\frac{3}{2}}$ as the answer or</p> <p>B1 for $2q^2$ and B1 for $q^{\frac{1}{2}}$ oe nfw</p>
17 (a)	correct working	2	<p>M1 for 1 holiday = 5 or $360 \div 72 = 5$ and B1 for $24 \times 5 [= 120]$ or</p> <p>M2 for $\frac{24}{72} \times 360 [= 120]$ oe</p>
(b)	6 nfw	3	<p>M1 for $150 + 120 + x + 2x = 360$ oe A1 for 30 identified as the required angle</p>
18 (a)	correct working	2	<p>B2 for $\sqrt[3]{\frac{1}{8}} = \frac{1}{2}$ or $\sqrt[3]{8} = 2$ AND $\frac{10}{2} = 5$ oe and $\frac{4}{2} = 2$ oe or</p> <p>B1 for $\sqrt[3]{\frac{1}{8}}$ or $\sqrt[3]{8}$ or $8 = 2^3$ or $\frac{1}{8} = (\frac{1}{2})^3$</p>

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