

Cambridge International Examinations Cambridge International General Certificate of Secondary Education

MATHEMATICS

0580/42 October/November 2016

Paper 4 Paper 4 (Extended) MARK SCHEME Maximum Mark: 130

Published

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Abbreviations

correct answer only
dependent
follow through after error
ignore subsequent working
or equivalent
Special Case
not from wrong working

soi seen or implied

Question	Answer	Mark	Part marks
1 (a) (i)	11054.25 final answer	2	M1 for $18000 \times \left(1 - \frac{15}{100}\right)^3$ oe
(ii)	16 500	3	M2 for $14025 \div \left(1 - \frac{15}{100}\right)$ oe or M1 for recognition of 14.025 as 85% soi
(b)	260 final answer	2	M1 for $P(1+\frac{5}{2})^2 = 286.65$ oe
		_	
(c) (i)	6.18	3	M2 for $\frac{224.72 - 200}{200 \times 2} \times 100$ oe
			or $\frac{1}{2} \left(\frac{224.72}{200} \times 100 - 100 \right)$
			or M1 for $\frac{200 \times r \times 2}{100}$ or $\frac{224.72 - 200}{200 \times 2}$ or
			$\frac{224.72}{200}$ ×100 – 100 soi by 12.36
			If zero scored, SC1 for 56.18 or 56.2 as final answer
(ii)	6	3	M2 for $\sqrt{\frac{224.72}{200}}$ or $\sqrt{\frac{224.72}{2}}$ soi by 1.06 or
			106 or 10.6
			or M1 for $200\left(1+\frac{r}{100}\right)^2 = 224.72$ oe

Ρ	age 3		Mark Scheme			Syllabus	Paper
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	Questi	on	Answer	Mark	Part m	arks	
2	(a)		1 1	1 1			
	(b)		Fully correct graph	4	B3FT for 6 or 7 points plo or B2FT for 4 or 5 points or B1FT for 2 or 3 points	otted plotted plotted	
	(c) (i	i)	-1 < ans < -0.8 1.25 < ans < 1.45 2.5 < ans < 2.6	1 1 1			
	(ii	i)	-0.7 < ans < -0.5	2	M1 for evidence of $y = -x$	$x \text{ or } \frac{x^3}{3} - x^2$	+1 = -x
	(d) (i	i)	y = 1 to 1.1 oe	1FT	FT only if a clear maximu	um point	
			y = -0.4 to -0.33 oe	1FT	FT only if a clear minimu	ım point	
	(ii	i)	-0.4 to -0.33 oe	1FT	Correct or FT <i>their</i> graph		
3	(a)		$\frac{240\sin 85}{\sin 50}$	M2	or M1 for $\frac{\sin 50}{240} = \frac{\sin 85}{AB}$	oe	
			312 or 312.1	B 1			
	(b)		$\frac{1}{2} \times 180 \times 240 \times \sin A = 12000$	M1			
			33.748 to 33.749	A2	A1 for $\sin = \frac{24000}{43200}$ or be or 0.5 or 0.5555 to 0.555	etter or 0.555 56	or 0.556
	(c)		328 or 328.3 to 328.5	5	B1 for [angle $A =$] 78.75 s	seen	
					M2 for $180^2 + (their AB)^2 - 2 \times 18$ or M1 for cos78.75 = $\frac{180}{2}$ A1 for 107 800 to 107 900	$80 \times their AB$ $\frac{2}{2} + (theirAB)$ $\times 180 \times (their)$	$\frac{x \cos 78.75}{(AB)}$
	(d) (i	i)	108.75 or 108.7 or 108.8	1			
	(ii	i)	288.75 or 288.7 or 288.8	2FT	FT 180 + <i>their</i> (d)(i) M1 for 180 + <i>their</i> (d)(i) or 360 - (180 - <i>their</i> (d)(i))		

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	Question		Answer	Mark	Part marks
4	(a)		15	2	M1 for $10 \div 40$ [× 60]
•	(b)		49.2 nfww	4	M1 for 35, 42.5, 47.5, 52.5, 57.5, 70 soi
					M1 for Σfx 8 × 35 + 22 × 42.5 + 95 × 47.5 + 55 × 52.5 + 14 × 57.5 + 6 × 70
					M1 dep for <i>their</i> $\Sigma fx \div 200$
(c)			Fully correct histogram	4	B3 for 4 correct blocks or B2 for 2 or 3 correct blocks or B1 for 1 correct block
			If zero scored, SC1 for correct frequency densities 0.8, 19, 11, 2.8, 0.3 soi		
(d) (i)			125, 180	1	
(ii)			Correct diagram	3	 B1FT <i>their</i> (d)(i) for 6 correct heights within correct square(including boundaries) or touching correct line if should be on a grid line and B1 for 6 points at upper ends of intervals on correct vertical line and B1FT (dep on at least B1) for increasing curve or polygon through 6 points If zero scored, SC1FT for 5 correct points plotted
	(iii)	(a)	48 to 49	1	
	()	(h)	55	1	
		(c)	8 to 14	2FT	B1FT for 186 to 192 seen

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Question	Answer	Mark	Part n	narks		
5 (a) (i)	$\frac{\frac{3}{4}}{\frac{7}{8}}, \frac{1}{\frac{1}{8}}$	2	B1 for any 2 correct			
(ii)	$\frac{21}{32}$ oe	2	M1 for $\frac{7}{8} \times \frac{3}{4}$ oe			
(iii)	$\frac{441}{1024}$ oe	2FT	M1 for $\left(\frac{7}{8} \times \frac{3}{4}\right)^2$ or <i>their</i>	((a)(ii)) ² oe		
(b)	175	2	M1 for $200 \times \frac{7}{8}$			
(c)	2400	2	M1 for 1575 ÷ <i>their</i> (a)(ii)		

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	Question	Answer	Mark	Part marks		
6	(a) (i)	1.32	2	M1 for $0.8 \times 1.5 \times 1.1$		
	(ii)	0.725 or 0.7246 to 0.7247	2	M1 for $\pi r^2 \times 0.8 = their(a)(i)$ or $\pi r^2 = 1.5 \times 1.1$ oe		
	(iii)	0.513 to 0.518 nfww	5	M1 for $2(1.5 \times 1.1 + 1.5 \times 0.8 + 1.1 \times 0.8)$		
				M1 for $[2 \times] \pi \times (their (a)(ii))^2$		
				M2 for $\pi \times 2 \times (their (a)(ii)) \times 0.8$ or M1 for $\pi \times 2 \times (their (a)(ii))$		
	(b) (i)	$\begin{array}{l} x + y \ge 9 \text{ oe} \\ y \ge 2 \text{ oe} \end{array}$	1 1	If zero scored, SC1 for $x + y > 9$ and $y > 2$		
(ii) Fully correct of unwanted reg		Fully correct diagram with unwanted region shaded	4	B1 for $2x + 3y = 24$ ruled		
				B1 for $x + y = 9$ ruled		
				B1 for $y = 2$ ruled		
	(iii)	20 [$x = $] 7 [$y =$] 2	1 1 1	If zero scored, SC1 for $2x + 3y$ evaluated from integers		

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7 (a)	(a) 54.50 final answer 2 B1 for 54.495 to 54.496 or or M1 for 200 ÷ 3.67		or 54.5		
(b) (i)	$\frac{1000}{x(x+1)}$ final answer	3	M1 for 1000 $(x + 1) - 1$ M1 for denominator $x(x)$	000x + 1)	
(ii)	$\frac{1000}{x} - \frac{1000}{x+1} = 4.5[0] \text{ oe}$	M1	Allow <i>their</i> (b)(i) for find fraction	rst M1 only f	or a single
	or $\frac{1000}{x(x+1)} = 4.5$ 1000 = 4.5x (x + 1) $4.5x^2 + 4.5x - 1000 = 0$ $9x^2 + 9x - 2000 = 0$	M1dep A1	Correctly multiplying by algebraic denominator Equation reached without any errors or omissions and at least one step after clearing		or clearing
(iii)	$\frac{-9\pm\sqrt{9^2-4(9)(-2000)}}{2(9)}$	2	the denominators of the brackets included B1 for $\sqrt{9^2 - 4(9)(-200)}$	$\overline{0}$	l with
	- 15.42 14.42	B1 B1	If in form $\frac{p+\sqrt{q}}{r}$ or $\frac{p}{r}$ B1 for $p = -9$ and $r = 2$ SC1 for answers -15.4 or -15.42 to $-15and 14.4 or 14.41 to 14or for -14.42 and 15.42or -15.42 and 14.42 se$	$\frac{\sqrt{-\sqrt{4}}}{r}$ then (9) 5.41 .42 2 en but not fir	nal answer
			Answers without work or SC1	ting only sco	re B1, B1
(iv)	69.34 to 69.37 final answer must be 2 dp	2FT	FT 1000 \div <i>their</i> positive rounded up or down to 2 or M1 for 1000 \div <i>their</i>]	e x with final 2 dp positive x	answer

Cambridge IGCSE - October/November 2016 0580 42 8 (a) $\begin{bmatrix} \mu = 1 \\ \nu = 1 \end{bmatrix} 160$ 1 1 (b) 6.24 or 6.244 to 6.245 3 M2 for $\sqrt{k^3 - 5^3}$ oe or B1 for suitable right angled triangle drawn with 5 on correct side or B1 for $1^2 + 5^3 = 8^3$ oe or B1 for suitable right angled triangle drawn with 5 on correct side (c) 5.05 or 5.052 2 M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe or M2 for $[x](x+1) - 4x\frac{5}{12}[x^n](x-1)$ oe, $n = 1, 2$ or 3 (d) 4 nfww 4 M3 for $[x^n](x+1) - 4x\frac{5}{12}[x^n](x-1)$ oe, $n = 1, 2$ or 3 or M2 for $[x](x+1) = (\frac{2}{12}]^2$ oe or M1 for 2^2 or $(\frac{1}{2})^2$ soi 9 (a) (i) 1.5 oe 1 (ii) $\frac{3}{y-2}$ oc final answer 3 M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay + b, a$ and $b \neq 0$ (b) (i) -3 1 (ii) 65536 final answer 2 B1 for h(16) oe e. h(2^4) (iii) -6 2 M1 for $3x + x + 3x + x = 60$ oc (b) 5 3 1 10 (a) 7.5 2 M1 for $3x + x + 3x + x = 60$ oc <t< th=""><th>Ρ</th><th>age 8</th><th colspan="3">Mark Scheme</th><th>Syllabus</th><th>Paper</th></t<>	Ρ	age 8	Mark Scheme			Syllabus	Paper
8 (a) $\begin{bmatrix} u = 1 \\ 0 \\ v = 1 \end{bmatrix} = 160$ 1 (b) 6.24 or 6.244 to 6.245 3 M2 for $\sqrt{8^2 - 5^2}$ oe or M1 for $l^2 + 5^2 = 8^2$ oe or B1 for suitable right angled triangle drawn with 5 on correct side (c) 5.05 or 5.052 2 M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe (d) 4 nfww 4 M3 for $[x^a](x+1) = 4 \times \frac{s}{12}[x^a](x-1)$ oe, $n = 1, 2$ or 3 (d) 4 nfww 4 M3 for $[x^a](x+1) = 4 \times \frac{s}{12}[x^a](x-1)$ oe, $n = 1, 2$ or 3 9 (a) (i) 1.5 oe 1 (ii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct removal of fraction M1 for collection of terms in x and factorises OR (iii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct division by expression of the form $y + b, a$ and $b \neq 0$ (b) (i) -3 1 1 (iii) 65 536 final answer 2 B1 for h(16) oe e.g. h(2^4) (iiii) -6 2 M1 for $2.x = 2^3$ oe (iv) 3 1 1 (iii) -6 2 M1 for $3.x + x + 3.x + x = 60$ oc (b) 5 3 B2 for $3.x + 4.x + 5.7 = 60$ or better or M1 for $(3.x^2 + (4.x)^2)$ oe </th <th></th> <th></th> <th>Cambridge IGCSE – Oct</th> <th>tober/No</th> <th>vember 2016</th> <th>0580</th> <th>42</th>			Cambridge IGCSE – Oct	tober/No	vember 2016	0580	42
(b) 6.24 or 6.244 to 6.245 3 M2 for $\sqrt{8^2 - 5^2}$ ac or M1 for $l^2 + 5^2 = 8^2$ oe or B1 for suitable right angled triangle drawn with 5 on correct side (c) 5.05 or 5.052 2 M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe (d) 4 nfvw 4 M3 for $[x^n](x+1) = 4 \times \frac{5}{12}[x^n](x-1)$ oe, $n = 1, 2$ or 3 (d) 4 nfvw 4 M3 for $[x^n](x+1) = 4 \times \frac{5}{12}[x^n](x-1)$ oe, $n = 1, 2$ or 3 9 (a) (i) 1.5 oe 1 (ii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct removal of fraction M1 for collection of terms in x and factorises OR R (iii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct division by expression of the form $ay + b, a$ and $b \neq 0$ (b) (i) -3 1 1 (ii) 65536 final answer 2 B1 for h(16) oe e.g. h(2^4) (iii) 65536 final answer 2 B1 for h(16) oe e.g. h(2^4) (iii) -5 2 M1 for $3x + x + 3x + x = 60$ oe (b) (i) -5 2 M1 for $3x^2 + 4x + 5x = 60$ or (b) 5 3 B2 for $3x + 4x + 5x = 60$ or 0 (b) 5 3	8	(a)	[u =] 80 [v =] 160	1			
(b) 6.24 or 6.244 to 6.245 3 M2 for $\sqrt{8^2} - 5^2$ oe or M1 for $l^2 + 5^2 - 8^2$ oe or M1 for $l^2 + 5^2 - 8^2$ oe or M1 for suitable tripted angled triangle drawn with 5 on correct side (c) 5.05 or 5.052 2 M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe (d) 4 nfww 4 M3 for $[x^n](x+1) = 4 \times \frac{5}{12} [x^n](x-1)$ oe, $n = 1, 2$ or 3 or M2 for $\frac{[x](x+1)}{\frac{5}{2}[x](x-1)} = \left(\frac{2[x]}{[x]}\right)^2$ oe or M1 for 2^2 or $\left(\frac{1}{2}\right)^2$ soi 9 (a) (i) 1.5 oe 1 (ii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct removal of fraction M1 for correct removal of fraction and M1 for correct removal of thetories or RM1 subtracts 2 from both sides M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay + b, a$ and $b \neq 0$ (b) (i) -3 1 (ii) 65536 final answer 2 B1 for h(16) oe e.g. h(2^4) (iii) -6 2 M1 for $3x + x + 3x + x = 60$ oe (b) 5 3 B2 for $3x + 4x + 5x = 60$ or (b) 5 3 B2 for $3x + 4x + 5x = 60$ or (c) 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} x \pi x 2 \times x = 60$ oe				1			
(c) 5.05 or 5.052 2 M1 for $f^4.5^2 = 8^2$ oc or BI for sutuble right angled triangle drawn with 5 on correct side (d) 4 nfww 2 M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oc (d) 4 nfww 4 M3 for $[x^n](x+1) = 4 \times \frac{1}{12} [x^n](x-1)$ oe, $n = 1, 2$ or 3 or M2 for $[x^n](x+1) = 4 \times \frac{1}{12} [x^n](x-1)$ oe, $n = 1, 2$ or 3 or M2 for $[\frac{1}{2}]^2$ soi 9 (a) (i) 1.5 oe 1 (ii) $\frac{3}{y-2}$ oe final answer 3 M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay + b, a$ and $b \neq 0$ (b) (i) -3 1 (ii) 65 536 final answer 2 B1 for h(16) oe e.g. h(2^4) (iii) -6 2 M1 for $3x + x + 3x + x = 60$ oe (b) 5 3 B2 for $3x + 4x + 5x = 60$ or (b) 5 3 B2 for $3x + 4x + 5x = 60$ or (c) 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} x \pi x 2 \times x $ [= 60] or or M1 for $\frac{90}{210} x \pi x 2 \times x$ oe		(b)	6.24 or 6.244 to 6.245	3	M2 for $\sqrt{8^2 - 5^2}$ oe		
(e)5.05 or 5.0522M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe(d)4 nfww4M3 for $[x^a](x+1) = 4 \times \frac{4}{12}[x^a](x-1)$ oe, $n = 1, 2$ or 3(d)4 nfww4M3 for $[x^a](x+1) = 4 \times \frac{4}{12}[x^a](x-1)$ oe, $n = 1, 2$ or 3(d)4 nfww4M3 for $[x^a](x+1) = 4 \times \frac{4}{12}[x^a](x-1)$ oe, $n = 1, 2$ or 3(e)(f)1.5 oe1(f) $\frac{3}{y-2}$ oe final answer3M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay + b, a$ and $b \neq 0$ (b)(f) -3 1(fi) 65536 final answer2B1 for h(16) oe e.g. h(2^4)(fii) -6 2M1 for $2 - x = 2^3$ oe(fiii) -5 1(fiii) 7.5 2M1 for $3x + x + 3x + x = 60$ oc(b) 5 3 B2 for $3x + 4x + 5x [= 60]$ or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe					or M1 for $l^2 + 5^2 = 8^2$ oe or B1 for suitable right an with 5 on correct side	gled triangle	drawn
(d)4 nfww4M3 for $[x^n](x+1) = 4 \times \frac{1}{12} [x^n](x-1)$ oe, $n = 1, 2$ or 3(d)4 nfww4M3 for $[x^n](x+1) = 4 \times \frac{1}{12} [x^n](x-1)$ oe, $n = 1, 2$ or 3or M2 for $\frac{[x](x+1)}{\frac{1}{12} [x](x-1)} = \left(\frac{2[x]}{[x]}\right)^2$ oe or M1 for 2^2 or $\left(\frac{1}{2}\right)^2$ soi9(a)(i)1.5 oe11(ii) $\frac{3}{y-2}$ oe final answer33M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides M1 subtracts 2 from both sides M1 multiplies by x to remove fraction and 		(c)	5.05 or 5.052	2	M1 for $\frac{4.8}{2.5} = \frac{9.7}{MN}$ oe		
or M2 for $\frac{[x](x+1)}{\frac{5}{2}[x](x-1)} = \left(\frac{2[x]}{[x]}\right)^2$ oe or M1 for 2^2 or $\left(\frac{1}{2}\right)^2$ soi9 (a) (i)1.5 oe1(ii) $\frac{3}{y-2}$ oe final answer3M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay + b$, a and $b \neq 0$ (b) (i) -3 1(ii) 65536 final answer2B1 for h(16) oe e.g. h(2^4)(iii) -6 2M1 for $2-x=2^3$ oe(iv)3110 (a)7.52M1 for $3x + x + 3x + x = 60$ oe(b)53B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.803M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(d)	4 nfww	4	M3 for $[x^n](x+1) = 4 \times \frac{5}{12}$ or 3	$[x^n](x-1)$ or	e, <i>n</i> = 1, 2
9 (a) (i)1.5 oe1(ii) $\frac{3}{y-2}$ oe final answer3M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides 					or M2 for $\frac{[x](x+1)}{\frac{5}{12}[x](x-1)} = \left($	$\left(\frac{2[x]}{[x]}\right)^2$ oe	
9 (a) (i)1.5 oe1(ii) $\frac{3}{y-2}$ oe final answer3MI for correct removal of fraction MI for collection of terms in x and factorises OR MI subtracts 2 from both sides MI multiplies by x to remove fraction and MI for correct division by expression of the form $ay + b$, a and $b \neq 0$ (b) (i) -3 1(ii) 65536 final answer2(iii) 65536 final answer2(iii) -6 2(iii) -6 2(iii) 7.5 2(iv)3110 (a) 7.5 2(b)53(c) $16.8 \text{ or } 16.80$ 3W1 for $2 + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or MI for $\frac{90}{260} \times \pi \times 2 \times x$ oe					or M1 for 2^2 or $\left(\frac{1}{2}\right)^2$ soi		
(ii) $\frac{3}{y-2}$ oe final answer (ii) $\frac{3}{y-2}$ oe final answer 3 MI for correct removal of fraction MI for collection of terms in x and factorises OR MI subtracts 2 from both sides MI multiplies by x to remove fraction and MI for correct division by expression of the form $ay + b$, a and $b \neq 0$ (b) (i) -3 (ii) 65 536 final answer 2 B1 for h(16) oe e.g. h(2 ⁴) (iii) -6 2 MI for $2 - x = 2^3$ oe (iv) 3 1 10 (a) 7.5 2 MI for $3x + x + 3x + x = 60$ oe 3 B2 for $3x + 4x + 5x [= 60]$ or better or MI for $(3x)^2 + (4x)^2$ oe (c) 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x [= 60]$ oe or MI for $\frac{90}{360} \times \pi \times 2 \times x$ oe	9	(a) (i) 1.5 oe	1			
(b) (i)-31(ii)65 536 final answer2B1 for h(16) oe e.g. h(2 ⁴)(iii)-62M1 for $2 - x = 2^3$ oe(iv)3110 (a)7.52M1 for $3x + x + 3x + x = 60$ oe(b)53B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.803M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(ii) $\frac{3}{y-2}$ oe final answer	3	M1 for correct removal of fraction M1 for collection of terms in x and factorises OR M1 subtracts 2 from both sides M1 multiplies by x to remove fraction and M1 for correct division by expression of the form $ay \pm b$, a and $b \pm 0$		
(ii)65 536 final answer2B1 for h(16) oe e.g. h(2 ⁴)(iii)-62M1 for $2 - x = 2^3$ oe(iv)3110 (a)7.52M1 for $3x + x + 3x + x = 60$ oe(b)53B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.803M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(b) (i) –3	1			
(iii)-62M1 for $2 - x = 2^3$ oe(iv)3110 (a)7.52M1 for $3x + x + 3x + x = 60$ oe(b)53B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.803M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(ii) 65 536 final answer	2	B1 for h(16) oe e.g. h(2^4)	
(iv)3110 (a)7.52M1 for $3x + x + 3x + x = 60$ oe(b)53B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe(c)16.8 or 16.803M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(iii) –6	2	M1 for $2 - x = 2^3$ oe		
10 (a) 7.5 2 M1 for $3x + x + 3x + x = 60$ oe (b) 5 3 B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe (c) 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(iv) 3	1			
(b) 5 3 B2 for $3x + 4x + 5x [= 60]$ or better or M1 for $(3x)^2 + (4x)^2$ oe 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x [= 60]$ oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe	10	(a)	7.5	2	M1 for $3x + x + 3x + x = 0$	60 oe	
(c) 16.8 or 16.80 3 M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{260} \times \pi \times 2 \times x$ oe		(b)	5	3	B2 for $3x + 4x + 5x$ [= 60] or better or M1 for $(3x)^2 + (4x)^2$ oe		
3011		(c)	16.8 or 16.80	3	M2 for $x + x + \frac{90}{360} \times \pi \times 2 \times x$ [= 60] oe or M1 for $\frac{90}{360} \times \pi \times 2 \times x$ oe		