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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2010 question paper for the guidance of teachers

0580 MATHEMATICS

0580/42

Paper 42 (Extended), maximum raw mark 130

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 must be read in conjunction with the question papers and the report on the examination.

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

			The Land
	Page 2	Mark Scheme: Teachers' version	Syllabus
		IGCSE – May/June 2010	0580
Abbr cao	eviations correct ans	· · · · · · · · · · · · · · · · · · ·	Syllabus 170 170 170 170 170 170 170 170 170 170
cso don	correct solution dependent		Cloud
dep ft			*.Co2
isw	•	sequent working	.,
oe	or equivale	ent	

Abbreviations

or equivalent oe Special Case SC

without wrong working www

Qu.	Answers	Mark	Part Marks
1 (a)	$240 \div 8 \times 3 \text{ or } 240 \div 8 \times 5 \text{ or } \frac{3}{8} \text{ of } 240$	1	Accept reverse e.g. $90:150=3:5$ and $90+150=240$
	or $\frac{5}{8}$ of 240 oe		
(b) (i)	5 www 2	2	M1 for $\frac{100\times9}{90\times2}$ oe
(ii)	165 www 2	2	M1 for 99 ÷ 0.6 oe
(c)	162.24 final answer cao	2	M1 for $150 \times 1.04 \times 1.04$ oe implied by answer 162.2
(d) (i)	58.67 final answer cao	3	SC2 for 58.7 or M1 for $\frac{150 \times 4 \times 20}{100}$ oe (120)
			then M1 (dependent on the first M1) 328.67 – 150 – their 120 oe Answers of 208.67 or 208.7 imply first M1
(ii)	219 (.1) www 2	2	M1 for $\frac{328.67}{150} \times 100$ oe
2 (a) (i)	$\binom{15}{8}$	2	B1 each component
(ii)	17 www 2	2ft	ft their 15 and their 8. M1 for (their 15) ² + (their 8) ²
(b) (i)	$\frac{1}{2}\mathbf{v} - \frac{1}{2}\mathbf{c} \mathbf{or} \frac{1}{2}(\mathbf{v} - \mathbf{c}) \mathbf{cao}$	2	M1 for $\frac{1}{2}\overrightarrow{CV}$ soi
(ii)	$\frac{1}{2}\mathbf{c} + \frac{1}{2}\mathbf{v}$ again allowing brackets cao	2	M1 for \overrightarrow{OM} e.g. $\overrightarrow{OC} + \overrightarrow{CM}$ or better seen or \mathbf{v} – their (i) or \mathbf{c} + their (i)
(iii)	$\frac{1}{6}$ v - $\frac{1}{2}$ c again allowing brackets cao	2	M1 for any correct route e.g. $\overrightarrow{MV} + \overrightarrow{VL}$ or their (i) $-\frac{1}{3}$ v
			or $\frac{2}{3}$ v – their (b)(ii)

ige 3	Mark Scheme: Teachers' version	Syllabus
ige o	IGCSE – May/June 2010	0580
	IGCSE – May/June 2010	0580

		1	Thursdown this supption is a superior in the superior is a superior is a superior in the superior in the superior is a superior in the superior in t
3			Throughout this question isw any cance or changing to other forms, after correct answer seen. Penalty of –1 for 2 sf decimals or percentages. Do not accept ratio or worded forms.
(a) (i)	$\frac{4}{6}$ oe (0.667)	1	Allow 0.6666 – 0.6667
(ii)	$\frac{3}{6}$ oe	1	
(iii)	$\frac{2}{6}$ oe (0.333)	1	Allow 0.3333
(iv)	$\frac{5}{6}$ oe (0.833)	1	Allow 0.8333
	$\frac{1}{36}$ oe (0.0278)	2	Allow 0.02777 – 0.02778, M1 for $\frac{1}{6} \times \frac{1}{6}$
(ii)	$\frac{6}{36}$ oe (0.167) www 2	2	Allow 0.1666 – 0.1667, M1 for $\frac{3}{6} \times \frac{1}{6} \times 2$ oe
(c) (i)	$\frac{1}{4}$ oe	1	
(ii)	$\frac{1}{2}$ oe	1	
(d)	5 (but not from rounding)	2	M1 for repeating $\times \frac{4}{6}$ oe e.g. $\left(\frac{2}{3}\right)^n$
4 (a) (i)	Triangle with vertices $(-4, 4), (-1, 4), (-1, 6)$	2	SC1 for translation $\begin{pmatrix} -7 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 3 \end{pmatrix}$
(ii)	Triangle with vertices $(1, -3), (1, -6), (3, -6)$	2	SC1 two correct vertices or 90° anticlockwise about (0, 0)
(b) (i)	Reflection only $y = -x$ oe	1 1	Marks independent but must be single transformation to score any marks
(ii)	Stretch only x-axis oe invariant (factor) 3	1 1 1	Marks independent but must be single transformation to score any marks

		Why 1	O.
Page 4	Mark Scheme: Teachers' version	Syllabus '2	
	IGCSE – May/June 2010	0580	3.
		PAR	S

		1	102
(c) (i)	$ \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix} $	2	B1 each column
	$\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ $\begin{pmatrix} 1 & 0 \\ 0 & 3 \end{pmatrix} \text{ ft}$	2 ft	ft factor in (b)(ii) only if stretch and can recover to correct matrix SC1ft for right-hand column
(iii)	$ \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{3} \end{pmatrix} ft $	1 ft	$\left \text{ ft } \begin{pmatrix} 1 & 0 \\ 0 & n \end{pmatrix} \text{ to } \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{n} \end{pmatrix} \text{ or } \begin{pmatrix} n & 0 \\ 0 & 1 \end{pmatrix} \text{ to } \begin{pmatrix} \frac{1}{n} & 0 \\ 0 & 1 \end{pmatrix} \right $
			$n \neq 0, \pm 1$
			for $\frac{1}{3}$, allow 0.33 or better
5 (a)	$(\cos) \frac{180^2 + 115^2 - 90^2}{2 \times 180 \times 115}$	M2	M1 for correct implicit expression $90^2 = \dots$
	24.98 – 24.99	A2	A1 for $(\cos) = 0.9064$
(b) (i)	125(.0) ft	1 ft	ft 150 – their (a)
(ii)	305(.0) ft	1 ft	ft 180 + their (b)(i)
			() ()
(c)	180sin (54.98 to 55) or 180cos (35 to 35.02) oe or 180sin (360 – their (b)(ii)) or 180cos(their (b)(i) – 90) oe	M2	B1 for 54.98 to 55 or 35 to 35.02 soi in correct position. Provided either angle is acute
	147(.4) cao www 3	A1	
(d)	$\frac{90\sin 30}{\sin 70}$	M2	M1 for $\frac{TR}{\sin 30} = \frac{90}{\sin 70}$ or other correct implicit equation
	47.9 (47.88 – 47.89) cao www 3	A1	
(e)	2 000 000 oe	2	Allow 1: 2 000 000 as answer. SC1 figs 2 in answer which could be a ratio.
6 (a)	$\frac{4}{3}\pi \times 2.4^3$	M1	Must see method
	57.87 – 57.92 to at least 4 figures	A1	
(b) (i)	14.4, 9.6, 4.8	1, 1, 1	Any order
(ii)	664 (663.5 – 663.6) ft	1 ft	
(iii)	315 or 316 or 317 (315.2 – 316.8) ft	1 ft	ft their (b)(ii) -6×57.9 (only if positive)
(iv)	507 (506.8 – 506.9) ft	2ft	M1 for $(14.4 \times 9.6 + 14.4 \times 4.8 + 9.6 \times 4.8) \times 2$ or their 3 lengths.

		W.	1 2 0/1
Page 5	Mark Scheme: Teachers' version	Syllabus '%	2
	IGCSE – May/June 2010	0580	3.
			J. (%)

	T	•	94,
(c) (i)	Height seen or implied as 6 × 4.8 or better	M1	Indep
	$\pi \times 2.4^2 \times \text{their height}$	M1	Indep
	521 (520.8 – 521.3) www 3	A1	1
(ii)	174 or 173 (173.2 – 174.1) ft	1 ft	ft their (c)(i) -6×57.9 ° only if positive
(iii)	470 – 471 cao www 3	3	M1 for $2 \times \pi \times 2.4^2$ (36.17 to 36.2), and M1 indep for $\pi \times 4.8 \times$ their height from (c)(i)
7 (a)		M1 M1	mid-values any three soi Use of Σfx dep on x anywhere in each interval (including lower bound) – allow 2 slips or omissions
	÷ 200 21.9 www 4	M1 A1	Depend on second M
(b)	155, 180	1	
(c)	8 points plotted ft, ignoring (0, 0) Reasonable increasing curve or polygon through their 8 points	P3ft C1ft	P2ft for 6 or 7 plotted, P1ft for 4 or 5 plotted Condone starting at (5, 12) and ft only if shape correct.
(d)	Either horizontal or vertical line at least 1 cm long at $y = 50$ on the curve	1	
(e) (i)	22 – 23	1	
(ii)	13.5 – 14.5	1	
(iii)	25.5 – 26.5	1	
(iv)	136 – 140 must be integer	2	SC1 for 60 – 64 seen and must be integer
8 (a)	$(p+q)^2 - 5$ oe final answer	2	SC1 for $(p+q)^2$ oe seen
			4 1)
(b)	6x + 9(x - 3) = 51 or better	В3	B2 for $6x + 9(x - 3)$
			or B1 for $6x$ or $9(x-3)$
	5.2(0) final answer	B1	5.2(0) ww is B1 only
(c)	a + c = 52 oe	B1	Condone consistent use of other variables
	3a + 2c = 139 oe	B1	or M3 for $3a + 2(52 - a) = 139$
	Composite aliminating	M1	or $3(52-c) + 2c = 139$ o.e.
	Correctly eliminating <i>a</i> or <i>c</i> . 35	M1 A1	Allow one numerical slip.
			If A0, SC1 for 17, 35
	17	A1	

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Page 6	Mark Scheme: Teachers' version	Syllabus · 1	
	IGCSE – May/June 2010	0580	2
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			.42

9 (a) (i) Similar 1 Allow enlargement (ii) 4.5 2 M1 for $\frac{AX}{3} = \frac{9}{6}$ oc (iii) 13.5 cao 2 M1 for $\frac{3}{2}$ or $\left(\frac{2}{3}\right)^2$ oc e.g. using base and height but other methods must be complete (iv) $180 - x - y$ oe B1 B1 (b) (i) 96 1 (ii) 48 ft 1ft (iii) 97 ft 1ft (iii) 97 ft 1ft (iv) 35 1 (c) $20n = 360$ oe or $\frac{180(n-2)}{n} = 160$ oe or $\frac{8}{n}$ or $\frac{360}{n}$ M1 for $9e = 180$ oe allow diagram to show this if reasonably clear or M1 for 8×360 or $\frac{8 \times 360}{n}$ 10 (a) Pentagon Octagon 1 1, 1 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2$, $q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{2}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n = 3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170			1	
(ii) 4.5 (iii) 13.5 cao 2 M1 for $\frac{3A}{3} = \frac{3}{6}$ oe (iv) 180 - x - y oc 180 - x oc B1 B1 (b) (i) 96 (ii) 48 ft 1ft 1ft 145 - their (b)(i) 1ft 145 - their (b)(ii) 1 (iv) 35 (c) $20n = 360$ oc or $\frac{180(n-2)}{n} = 160$ oc or $8(\frac{360}{n}) = 180 - \frac{360}{n}$ 18 www 3 A1 10 (a) Pentagon Octagon 20 (b) (i) $p = 2, q = 3$ M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2 n \ge 3$ or M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2 n \ge 3$ or M1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 M1 for $\frac{3A}{2} = \frac{3}{6}$ oe M1 for $\frac{3A}{2} = \frac{3}{6}$ oc M1 for $\frac{3A}{2} = \frac{3}{6}$ oc e.g. using base and height but other methods must be complete M1 for $\frac{3A}{2} = \frac{3}{6}$ oe e.g. using base and height but other methods must be complete M1 for $\frac{3A}{2} = \frac{3}{6}$ oc e.g. using base and height but other methods must be complete M2 ft 0.5 their (b)(i) ft 145 - their (b)(ii) M1 for $9e = 180$ oe allow diagram to show this if reasonably clear or M1 for 8 × 360 or $\frac{8 \times 360}{n}$ The matrix of $\frac{3}{n} = \frac{3}{6}$ or $\frac{3}{n} = \frac{3}{6}$	9 (a) (i)	Similar	1	Allow enlargement
height but other methods must be complete	(ii)	4.5	2	M1 for $\frac{AX}{3} = \frac{9}{6}$ oe
(iv) $180 - x - y$ or $180 - x - y$ or $180 - x$ or 180	(iii)	13.5 cao	2	M1 for $\left(\frac{3}{2}\right)^2$ or $\left(\frac{2}{3}\right)^2$ oe e.g. using base and
180 - x oe B1				height but other methods must be complete
(b) (i) 96 (ii) 48 ft (iii) 97 ft (iii) 97 ft (iv) 35 (c) $20n = 360 \text{ oe or } \frac{180(n-2)}{n} = 160 \text{ oe or } 180(n-2) = 8 \times 360 \text{ oe or } 8 \times 360 \text{ oe or } 8 \times 360 \text{ oe or } 8 \times 360 \text{ or } 8 \times 360 $	(iv)			
(ii) (iii) 97 ft 1ft (1ft) 1ft ft 0.5 their (b)(i) (iii) 97 ft 1ft (1ft) 1ft ft 145 – their (b)(ii) (c) $20n = 360$ oc or $\frac{180(n-2)}{n} = 160$ oc or $180(n-2) = 8 \times 360$ oc or $8\left(\frac{360}{n}\right) = 180 - \frac{360}{3n}$ M2 MI for $9e = 180$ oc allow diagram to show this if reasonably clear or MI for 8×360 or $\frac{8 \times 360}{n}$ 10 (a) Pentagon Octagon 20 1 1, 1 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 MI for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or MI for number of diagonals from one vertex is $n - 3$ (allow in words) and BI for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or MI for their formula = 170		180 - x oe	B1	
(ii) (iii) 97 ft 1ft (1ft) 1ft ft 0.5 their (b)(i) (iii) 97 ft 1ft (1ft) 1ft ft 145 – their (b)(ii) (c) $20n = 360$ oc or $\frac{180(n-2)}{n} = 160$ oc or $180(n-2) = 8 \times 360$ oc or $8\left(\frac{360}{n}\right) = 180 - \frac{360}{3n}$ M2 MI for $9e = 180$ oc allow diagram to show this if reasonably clear or MI for 8×360 or $\frac{8 \times 360}{n}$ 10 (a) Pentagon Octagon 20 1 1, 1 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 MI for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or MI for number of diagonals from one vertex is $n - 3$ (allow in words) and BI for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or MI for their formula = 170	(b) (i)	96	1	
(iii) 97 ft 1ft ft 145 – their (b)(ii) (c) $20n = 360$ oe or $\frac{180(n-2)}{n} = 160$ oe or $180(n-2) = 8 \times 360$ oe or $8(\frac{360}{n}) = 180 - \frac{360}{n}$ M2 M1 for $9e = 180$ oe allow diagram to show this if reasonably clear or M1 for 8×360 or $\frac{8 \times 360}{n}$ 10 (a) Pentagon Octagon 20 1, 1 (b)(i) 35 1 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}$ or M1 for number of diagonals from one vertex is $n - 3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft their (e)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170				ft 0.5 their (b)(i)
(c) $20n = 360$ or $\frac{180(n-2)}{n} = 160$ or $\frac{180(n-2)}{n} = 160$ or $180(n-2) = 8 \times 360$ or $\frac{360}{n} = 180 - \frac{360}{n}$ 18 www 3 A1 10 (a) Pentagon Octagon 20 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p} 4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n = 3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft (iii) 20 cao 20 Can be allow diagram to show this if reasonably clear or M1 for 8 × 360 or $\frac{8 \times 360}{n}$ M1 for substituting a value of n e.g. $\frac{1}{p} 4(4-q) = 2$ $n \ge 3$ Or M1 for number of diagonals from one vertex is $n = 3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (iii) 4850 ft Can be a second or M2 for answer of 17 or M1 for their formula = 170	(iii)	97 ft	1 ft	ft 145 – their (b)(ii)
or $180(n-2) = 8 \times 360$ oe or $8\left(\frac{360}{n}\right) = 180 - \frac{360}{n}$ 18 www 3 A1 10 (a) Pentagon Octagon 20 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170	(iv)	35	1	
or $180(n-2) = 8 \times 360$ oe or $8\left(\frac{360}{n}\right) = 180 - \frac{360}{n}$ 18 www 3 A1 10 (a) Pentagon Octagon 20 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170	(c)	$20n = 360$ oe or $\frac{180(n-2)}{n} = 160$ oe	M2	_
10 (a) Pentagon Octagon 20 1, 1 (b)(i) 35 1 1 (c)(i) $p = 2, q = 3$ 3 MI for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or MI for number of diagonals from one vertex is $n - 3$ (allow in words) and BI for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170		or $180(n-2) = 8 \times 360$ oe		1
10 (a) Pentagon Octagon 20 1, 1 (b)(i) 35 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n - 3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (e)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170		or $8\left(\frac{360}{n}\right) = 180 - \frac{360}{n}$		or M1 for 8×360 or ${n}$
Octagon 20 1, 1 (b)(i) 35 (ii) 54 1 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q)=2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170		18 www 3	A1	
(b)(i) 35	10 (a)	-		
(ii) 54 (c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170		Octagon 20	1, 1	
(c)(i) $p = 2, q = 3$ 3 M1 for substituting a value of n e.g. $\frac{1}{p}4(4-q) = 2$ $n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170	(b)(i)	35	1	
$\frac{1}{p}4(4-q) = 2 n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3) \text{ seen.}$ (iii) 4850 ft $1 \text{ ft their (c)(i) allow only if ft calculates to a positive integer.}$ 2 SC1 for answer of 17 or M1 for their formula = 170	(ii)	54	1	
$\frac{1}{p}4(4-q) = 2 n \ge 3$ or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3) \text{ seen.}$ (iii) 4850 ft $1 \text{ ft their (c)(i) allow only if ft calculates to a positive integer.}$ 2 SC1 for answer of 17 or M1 for their formula = 170			_	
or M1 for number of diagonals from one vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170	(c)(i)	p = 2, q = 3	3	
vertex is $n-3$ (allow in words) and B1 for one correct value. If 0, SC1 for $\frac{n}{2}(n-3)$ seen. (ii) 4850 ft 1ft ft their (c)(i) allow only if ft calculates to a positive integer. 2 SC1 for answer of 17 or M1 for their formula = 170				$ \frac{-4(4-q)}{p} = 2 n \ge 3 $
(ii) 4850 ft 1ft $\frac{n}{2}(n-3)$ seen. (iii) 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170				vertex is $n-3$ (allow in words)
positive integer. 20 cao 2 SC1 for answer of 17 or M1 for their formula = 170				
or M1 for their formula = 170	(ii)	4850 ft	1 ft	The state of the s
(d) 31 cao 1	(iii)	20 cao	2	
	(d)	31 cao	1	