

#### CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/63 October/November 2017

Paper 6 (Extended) MARK SCHEME Maximum Mark: 40

Published

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# MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

#### **Types of mark**

- M Method marks, awarded for a valid method applied to the problem.
- A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.
- B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

#### Abbreviations

answers which round to awrt correct answer only cao dep dependent follow through after error FT ignore subsequent working isw not from wrong working nfww or equivalent oe rounded or truncated rot Special Case SC seen or implied soi

## 0607/63

Question	Answer						Marks	Guidance	
A	INVESTIGATION CHEQUERED FLAGS								
1(a)	10 10						1		
1(b)(i)	Size of flag								<b>B1</b> for at least five unshaded
		2 by 1	2 by 2	2 by 3	2 by 4	2 by 5	2 by <i>n</i>		numerical pairs correct and
	Black	1	2	3	4	5	n		<b>B1</b> for all four algebraic expressions correct
	White	1	2	3	4	5	n		
				Size	e of flag				
		4 by 1	4 by 2	4 by 3	4 by 4	4 by 5	4 by <i>n</i>		
	Black	2	4	6	8	10	2 <i>n</i>		
	White	2	4	6	8	10	2 <i>n</i>		
1(b)(ii)	$ \begin{array}{ccc} 3n & \text{oe} \\ 3n & \text{oe} \end{array} $							1	
1(c)	8							1	C opportunity
1(d)	$\frac{mn}{2}$ oe						1		
2(a)	8 7							1	
2(b)	[No] one of <i>m</i> or <i>n</i> must be even							1	
2(c)	Black White	3 by 2 1	3	y 2 3 t Size	5 4 of flag	6 6	8 by 5 8 7	1 At least four of the unshaded pairs correct	
	Black White	5 by 3 2	1 5 by 5 5		by 3     5       8     7	iby 4     5       10     10	5 by 5 13 12		
2(d)	$\frac{mn}{2} + \frac{1}{2}$	oe [blac	:k]					2	B1 for each
	$\frac{mn}{2}-\frac{1}{2}$	oe [whi	te]						

0607/63

Question	Answer							Marks	Guidance
3(a)	8 8 8							1	
3(b)(i)	Size of flag								<b>B1</b> for all numerical
		3 by 1	3 by 2	3 by 3	3 by 4	3 by 5	3 by <i>n</i>		unshaded triples correct and
	Black	1	2	3	4	5	п		<b>B1</b> for all algebraic triples
	White	1	2	3	4	5	n		correct
	Grey	1	2	3	4	5	n		
	Size of flag								
		6 by 1	6 by 2	6 by 3	6 by 4	6 by 5	6 by <i>n</i>		
	Black	2	4	6	8	10	2 <i>n</i>		
	White Grey	2	4	6 6	8	10 10	2 <i>n</i> 2n		
	Gley	2	4	0	0	10	211		
3(b)(ii)	$\frac{mn}{3}$ oe							1	
3(b)(iii)	No and <i>n</i> must be a multiple of 3 oe							1	
4(a)	$\frac{16 \times 14}{6} = 37.3[] \text{ or is not integer}$							1	
4(b)	$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$							1	C opportunity
5	m or $n$ or $mn$ is a multiple of $p$ oe							1	
Communication: seen in one of the following questions						1			
1(c)	Showing	Showing (at least 2 different) pairs of factors of 24							
4(b)	$\frac{mn}{6} = 3 \text{ or } mn = 18$								

#### 0607/63

Question		Answer	Marks	Guidance
В	MODELLING	AREAS OF POL	YGONS	
1(a)	Width m Lengt	h m Area m <sup>2</sup>	1	
	1 1			
	2 10	) 20		
	3 9	27		
	4 8	32		
	5 7	35		
	6 6	36		
1(b)	Square		1	
2	6.93 or better		2	<b>B1</b> Accept 6.9 to 6.93 or
	27.71			$4\sqrt{3}$ or $\sqrt{48}$
				<b>B1</b> Accept 27.68 to 27.72
3(a)(i)	$360 \div 5$ oe leading to 72		1	
3(a)(ii)	3.3[0]		1	C opportunities
3(a)(iii)	(iii) 7.93 or 7.92 to 7.93			<b>FT</b> $2.4 \times their 3.3$ correctly evaluated to 3 s.f.
				<b>C</b> opportunity
3(a)(iv)	39.6 seen or 39.6	to 39.65	1	
3(b)	41.6 or 41.4 to 41.	.6	1	C opportunities
4(a)(i)	$\frac{41.6  \text{or } 41.4 \text{ to } 41}{0.5 \times \frac{24}{n}} \times \frac{\frac{12}{n}}{\frac{12}{\tan \frac{36}{2}}}$	$\frac{50}{n} \times n$ isw	1	
4(a)(ii)	Integer or $n \ge 3$ oe		1	
4(b)	$\frac{144}{8\tan\left(\frac{180}{8}\right)} = 43.4$	5[] or 43.45 to 43.50	) 1	

Question	Answer	Marks	Guidance						
В	MODELLING AREAS OF POLYGONS								
4(c)	Correct shape $50^+$ $10^ 10^-$	1							
4(d)	9	1	C opportunity						
4(e)	45.8	1	Accept 45 to 46						
4(f)(i)	circle	1							
4(f)(ii)	$\frac{144}{\pi}$	2	<b>M1</b> for $[r = ] \frac{12}{\pi}$ or <b>SC1</b> for 45.8[]						
4(g)	$\frac{P^2}{4n\tan\frac{180}{n}}$	1	C opportunity						
Communicat	tion: seen in two of the following questions	1							
3(a)(ii)	$\frac{a}{2} = 36$ or $\frac{2.4}{\tan 36}$ or 2.4 $\tan 54$ or $\frac{2.4 \sin 54}{\sin 36}$								
3(a)(iii)	$0.5 \times 4.8 \times their 3.3$ oe								
3(b)	$\frac{2}{\tan 30} \text{ or } \frac{2\sin 60}{\sin 30} \text{ or } 2\tan 60$								
4(d)	43.9[] for 9 or 44.3[] for 10								
4(g)	$\frac{360}{2n}$ or $\frac{180}{n}$ and $0.5 \frac{P}{n}$ or $\frac{P}{2n}$ seen								