CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/61　　　　　Paper 6 (Extended), maximum raw mark 40

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

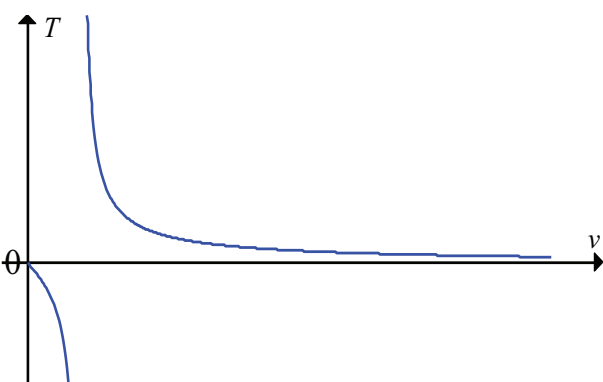Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

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Page 2	**Mark Scheme**	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	**0607**	**61**

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

A	**INVESTIGATION**	**STAIRCASES**		
1	**(a)**	3	**1**	
	(b)		**1**	
	(c)	Height: 1, 2, 3, 4, 5, 6 / Cubes: 1, 3, 6, **10**, **15**, **21**	**1**	
	(d)	$\frac{1}{2}n^2 + \frac{1}{2}n$ oe	**1**	**C** opportunity
	(e)	55	**1FT**	**FT** *their* **(d)** provided an expression in n with numerical coefficients **C** opportunity
2	**(a)**	16	**1**	
	(b)	Height: 1, 2, 3, 4, 5, 6 / Cubes: 1, **4**, 9, **16**, **25**, **36**	**1**	
	(c)	n^2	**1**	oe
	(d)	100	**1**	

For 1(c):

Height	1	2	3	4	5	6
Cubes	1	3	6	**10**	**15**	**21**

For 2(b):

Height	1	2	3	4	5	6
Cubes	1	**4**	9	**16**	**25**	**36**

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3	(a)								1FT	**FT** of all values double *their* **1(c)**

Height	1	2	3	4	5	6
Cubes	2	6	12	20	30	42

(b) $n^2 + n$ oe — 1 — **C** opportunity

(c) 110 — 1FT — **FT** *their* **(b)** provided an expression in *n* of correct order with numerical coefficients **C** opportunity

(d) 15 — 1 — **C** opportunity

4 (a) — 2 — **B1FT** for any two

Height	1	2	3	4	5	6
Cubes	1	6	18	40	75	126

(b) $\dfrac{1}{2}n^3 + \dfrac{1}{2}n^2$ oe — 1 — **C** opportunity

5 — 3FT

Type of staircase	Max height using 1800 cubes	Number of cubes left over
UP	59	30
UP/DOWN	42	36
DOUBLE	41	78
MULTIPLE	15	0

FT

their UP ($\dfrac{1}{2}n^2 + \dfrac{1}{2}n$),

their DOUBLE ($n^2 + n$),

their MULTIPLE ($\dfrac{1}{2}n^3 + \dfrac{1}{2}n^2$)

if expression in *n* with numerical coefficients of correct order with at least two terms

B1 for each pair (row)

if **B0** then allow **B1** for correct column of maximum heights

C opportunity

Communication seen in three of **1(d)**, **1(e)**, **3(b)**, **3(c)**, **3(d)**, **4(b)**, **5** — 1

B	MODELLING	BOAT TRIPS		
1	**(a)**	40	1	**C** opportunity
	(b)	6	1	**C** opportunity
2	**(a)**	$46.1[53...]$ or 46.2 seen or $\frac{10}{13} \times 60 = 46$ oe	1	may convert to metres per min etc; condone e.g. … = 46 seconds; allow $\times 60$ to be implied by units stated
	(b)	$4.33[3…]$ or $4\frac{1}{3}$ isw	1	**C** opportunity
	(c)	$13.0[3…]$ or $13\frac{1}{30}$	1	**C** opportunity
3	**(a)** **(i)**	$[T =]\dfrac{20}{v+2} + \dfrac{20}{v-2}$ oe isw	1	
	(ii)	$[T =]\dfrac{20(v-2) + 20(v+2)}{(v+2)(v-2)}$ oe isw or $T(v-2)(v+2) = 20(v-2) + 20(v+2)$ oe isw	2	**B1** for either correct numerator or denominator/left hand side or right hand side; must be from correct two partial fractions
	(iii)		2	**B1** correct shape with 2 branches **B1** asymptote at $v = 2$ only soi
	(iv)	$[k =]$ 2 with valid reason in context	1	not for e.g. T would be negative
	(b)	2.25 oe	1	
	(c)	$13.6[2...]$ to 13.63 isw	1	isw halving after correct answer seen

4	(a)	(i)	$[T =]\dfrac{40v}{v^2 - 9}$	1	or $[T =]\dfrac{40v}{v^2 - 3^2}$ isw
		(ii)	13.9[7…] to 14.0	1FT	**FT** from *their* 9; **FT** correct to at least 3 sf
	(b)		5	1	**C** opportunity
5	(a)		Valid explanation	1	e.g. total distance travelled is now 80 [km] or it now travels 40 [km] each way oe
	(b)		Stretch, [scale factor =] 2, *v*-axis invariant	2	**B1** for stretch with either factor 2 or *v*-axis invariant
Communication seen in two of **1(a)**, **1(b)**, **2(b)**, **2(c)**, **3(c)**, **4(b)**				1	