UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/06 Paper 6 (Extended), maximum raw mark 40

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.

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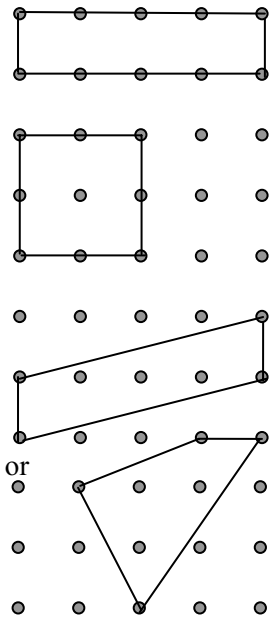
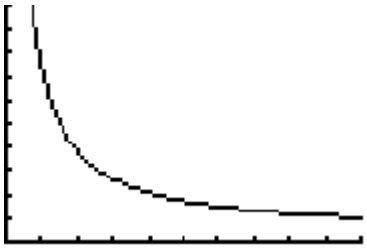
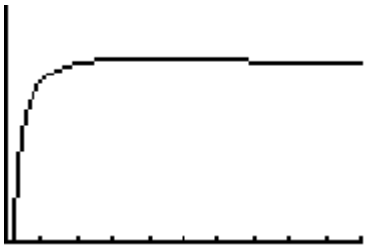
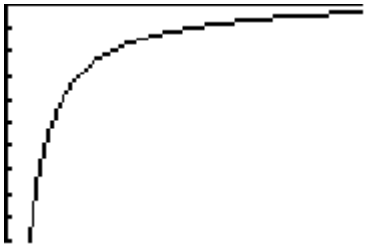
Question	Answer	Mark	Notes	Comments
A1 (a)	<table><tr><td>A</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>p</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td><td>14</td></tr></table>	3	B1 for entries 2, 3 and 8 B2 for other entries	deduct 1 per error or omission
(b)	$(p =) 2A + 2$ or $(p =) 2(A + 1)$ oe	2	B1 for $2A$	
(c)	$(A =) \frac{1}{2}p - 1$ or $(A =) \frac{p-2}{2}$ or $(A =) \frac{1}{2}(p - 2)$	2	B1 for their $\frac{1}{2}p$	ft from **(b)** if linear with two terms and coefficient of A more than 1
(d)	$A = \frac{1}{2} \times 6 - 1$ oe $= 2$	3	M1ft A1 cao	Assume M1 for $p = 6$ SC1 for 2 if C1 not awarded
	$A = \frac{1}{2} \times 2 \times 2$		C1	evidence of working out areas
2 (a)	2, 3, 4	1	B1	
(b)	increase in A = increase in i oe	1	B1	$A = i$ is not accepted
(c)	$p > 2$ or $p \geqslant 3$ oe	1	B1	There must be no upper bound other than 4 Communication for implying p is an integer
3	$p = 12$ $i = 10$ $\frac{1}{2}p + i - 1 = 15$		A1 M1 for substitution using Pick's equation	
	$A = 10 + \frac{1}{2} \times 5 \times 2$ or similar	4	M1 for use of areas seen in calculations or diagrams. A1 (using area method) cao	SC1 for 15
4	$3\frac{1}{2} + 4 - 1$ s.o.i. A = $6\frac{1}{2}$	2	M1 A1 OR B2	Communication

5 **(a)**	$p = 10 \quad i = 0$ $p = 8 \quad i = 1$ $p = 4 \quad i = 3$	2		+2 for each correct pair $= 6$, $i = 2$ –2 for each wrong pair and round up.
(b)	 or etc.	3	B1 for each quadrilateral	Communication mark for $\frac{1}{2}p + i - 1 = 4$ oe corresponding to their correct p and i Ignore extra shapes. (Further quadrilaterals are possible).
		1	Communication mark	Awarded in questions 2(c), 4 or 5(a)
	[Total: 25]			**Scaled to 20**

B1	**(a) (i)**	1 + 5% (oe) = 1.05 multiply by 1.05 each year	2	R1 R1	may be seen in formula
	(ii)	\$1630 or better	1	A1	Ignore extra decimal places.
	(b)	1000×1.05^{y}	1	B1	
	(c) (i)	$1000 \times 1.05^{y} = 2000$ OR To double 1000 multiply 1000 by 2	1	B1	
	(ii)	$y = \dfrac{\log 2}{\log 1.05}$ or $y = \log_{1.05} 2$	1	B1	Communication mark for $\log 1.05^{y} = \log 2$ or $y \log 1.05 = \log 2$ or $\log_{1.05} 2 = \log 2 / \log 1.05$ SC1 $14.2 \log 1.05 = 0.301 = \log 2$
		between 14.20 and 14.21	1	A1	
	(d) (i)	$\dfrac{x}{100} = x\%$	1	R1	$1 + \dfrac{x}{100}$ replaces 1.05 in calculations
	(ii)		2	G1 shape G1 not touching either axis	generous benefit of doubt
2	**(a)**	B or $(y =) \dfrac{k}{x}$	1	B1	Accept reciprocal or inverse variation
	(b)	$y = \dfrac{70}{x}$	1	B1ft	Accept $k = 70$ Condone 71 If wrong model then 2 figures or better (truncated or rounded) for k from: A 2.84 C 0.584 D 14.25 (degrees) or 50.059 (radians) E 19.2

3		35 (years)	1	B1ft	If $k = 71$ in 2(b), then 3 If wrong model then 2 figure (truncated or rounded) or better from A 5.68 C 2.27 D 14.245 or –20.8 E 17.2
4	**(a) (i)**	10.2 (years) or better, seen	1		
	(ii)	10 (years)	1	B1 their 70 ÷ 7	If $k = 71$ 10.1 or better, seen
	(b)	0.2 (years)	1	B1ft	their credited **4(a)(i)** – their credited **4(a)(ii)** If wrong model (ignoring negatives) then 2 figures or better truncated or rounded from A 19.88 C 27.832 D 14.148 or 37.74 E 12.2
5	**(a)**		1	G1	Communication mark only for roughly correct shape with a sensible vertical scale with max > 1 cm from x-axis Does not touch vertical axis. Accept horizontal after the maximum
	(b)	0.31 years	1	B1ft	Accept 0.3 Do not follow through wrong model Follow-through from $k = 71$ giving 0.29

6	The model is accurate for $1 \leq x \leq 100$ Model is not accurate with x close to 0.	[1] [1]	B1 with reasonable lower limit B1	Lower limit between 0. Communication mark for: (a) It is accurate to within 0.31 years or (b) The difference between the models becomes extremely large as x approaches 0. 
		[2]	C1 for one communication mark C2 for two	Communication marks possible in **1(c)(ii)**, **5(a)** and **6**
		[Total: 22]		**Scaled to 20**