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.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Mark</th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1 (a)</strong></td>
<td><img src="image" alt="Table" /></td>
<td>3</td>
<td>B2 for other entries</td>
<td>deduct 1 per error or omission</td>
</tr>
<tr>
<td>(b)</td>
<td>$(p =) 2A + 2 \text{ or } (p =) 2(A+1) \text{ oe}$</td>
<td>2</td>
<td>B1 for $2A$</td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>$(A =) \frac{1}{2}p - 1 \text{ or } (A =) \frac{p-2}{2}$</td>
<td>2</td>
<td>B1 for their $\frac{1}{2}p$</td>
<td>fit from (b) if linear with two terms and coefficient of $A$ more than 1</td>
</tr>
<tr>
<td>(d)</td>
<td>$A = \frac{1}{2} \times 6 - 1 \text{ oe}$</td>
<td>3</td>
<td>M1ft</td>
<td>Assume M1 for $p = 6$</td>
</tr>
<tr>
<td></td>
<td>$A = 2$</td>
<td></td>
<td>A1 cao</td>
<td>SC1 for 2 if C1 not awarded</td>
</tr>
<tr>
<td></td>
<td>$A = \frac{1}{2} \times 2 \times 2$</td>
<td></td>
<td>C1</td>
<td>evidence of working out out areas</td>
</tr>
<tr>
<td><strong>2 (a)</strong></td>
<td>2, 3, 4</td>
<td>1</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>increase in $A = $ increase in $i$ oe</td>
<td>1</td>
<td>B1</td>
<td>$A = i$ is not accepted</td>
</tr>
<tr>
<td>(c)</td>
<td>$p &gt; 2$ or $p \geq 3$ oe</td>
<td>1</td>
<td>B1</td>
<td>There must be no upper bound other than 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Communication for implying $p$ is an integer</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>$p = 12, i = 10$</td>
<td>A1</td>
<td>M1 for substitution using Pick’s equation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\frac{1}{2}p + i - 1 = 15$</td>
<td></td>
<td>M1 for use of areas seen in calculations or diagrams. A1 (using area method) cao</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$A = 10 + \frac{1}{2} \times 5 \times 2$ or similar</td>
<td>4</td>
<td>SC1 for 15</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>$3\frac{1}{2} + 4 - 1 \text{ s.o.i.}$</td>
<td>2</td>
<td>M1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$A = 6\frac{1}{2}$</td>
<td>A1</td>
<td>OR</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Question 5

<p>| | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
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</tbody>
</table>
| (a) | \( p = 10 \quad i = 0 \)  
     | \( p = 8 \quad i = 1 \)  
     | \( p = 4 \quad i = 3 \) | 2 |
| (b) |   |   |   |
|     |   |   |   |

<table>
<thead>
<tr>
<th></th>
<th>3</th>
</tr>
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<tbody>
<tr>
<td>B1 for each quadrilateral</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
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</table>

\[ \text{or} \quad \text{etc.} \]

- +2 for each correct pair except \( p = 6 \), \( i = 2 \)
- -2 for each wrong pair and round up.

Communication mark for

\[ \frac{1}{2} p + i - 1 = 4 \text{ oe} \]

- corresponding to their correct \( p \) and \( i \)
- Ignore extra shapes.
- (Further quadrilaterals are possible).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication mark</td>
<td>Awarded in questions 2(c), 4 or 5(a)</td>
</tr>
</tbody>
</table>

**Total: 25**

**Scaled to 20**

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<table>
<thead>
<tr>
<th>Mark Scheme: Teachers’ version</th>
<th>Syllabus</th>
<th>Paper</th>
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<td>IGCSE – May/June 2011</td>
<td>0607</td>
<td>06</td>
</tr>
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</table>

### 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)

$1000 \times 1.05^y$  

1 B1

### (c) (i)

$1000 \times 1.05^y = 2000$  

OR  

To double 1000 multiply 1000 by 2  

1 B1

### (ii)

\[ y = \frac{\log 2}{\log 1.05} \]  

or \[ y = \log_{1.05} 2 \]  

between 14.20 and 14.21  

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

### (d) (i)

\[ \frac{x}{100} = x\% \]  

1 R1  

1+ \[ \frac{x}{100} \] replaces 1.05 in  

calculations

### (ii)

G1 shape  

generous benefit of doubt

2 G1 not touching either axis

### 2 (a)

B or \( y = \frac{k}{x} \)  

1 B1

Accept reciprocal or inverse variation

### (b)

\[ y = \frac{70}{x} \]  

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 35.5 or 36
If wrong model then 2 figures
(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 | | If $k = 71$ 10.1 or better, seen
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 |
| (ii) | 10 (years) | 1 | B1 their $70 \div 7$ |
| (b) | 0.2 (years) | 1 | B1ft |
| 5 (a) | ![Graph](image) | 1 | G1 |
| (b) | 0.31 years | 1 | B1ft |

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
Accept 0.3
Do not follow through wrong model
Follow-through from $k = 71$ giving 0.29
The model is accurate for $1 \leq x \leq 100$

Model is not accurate with $x$ close to 0.

**[1]** B1 with reasonable lower limit

Lower limit between 0.5 and 3

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