

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2015 series**

**0607 CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/62**

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

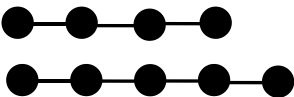
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Abbreviations

|      |                            |
|------|----------------------------|
| 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            |

| <b>A INVESTIGATION</b> |                |   |          |               |
|------------------------|----------------|---|----------|---------------|
| <b>1</b>               | <b>(a)</b>     |  | <b>1</b> |               |
|                        | <b>(b)</b>     | 4 3<br>5 4<br>6 5   | <b>1</b> |               |
|                        | <b>(c)</b>     | $[s =] m$   | <b>1</b> |               |
| <b>2</b>               | <b>(a)</b>     | 8 10<br>10 13<br>12 16  | <b>1</b> |               |
|                        | <b>(b) (i)</b> | $[s =] 2m$ oe   | <b>1</b> |               |
|                        | <b>(ii)</b>    | $[r =] 3m - 2$ oe   | <b>1</b> | C opportunity |
| <b>3</b>               | <b>(a)</b>     | 12 17<br>15 22<br>18 27   | <b>1</b> |               |
|                        | <b>(b) (i)</b> | $[s =] 3m$ oe   | <b>1</b> |               |
|                        | <b>(ii)</b>    | $[r =] 5m - 3$ oe   | <b>1</b> | C opportunity |

|        |                                 |          |       |
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|  |  |  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
|--|--|--|---|---|------|----------|------|----------|------|----------|------|----------|------|-----------|---|---|
| 4  | (a)                                    | <table border="1"> <tr> <td><math>m</math></td> <td><math>m - 1</math></td> </tr> <tr> <td><math>2m</math></td> <td><math>3m - 2</math></td> </tr> <tr> <td><math>3m</math></td> <td><math>5m - 3</math></td> </tr> <tr> <td><math>4m</math></td> <td><math>7m - 4</math></td> </tr> <tr> <td><math>5m</math></td> <td><math>9m - 5</math></td> </tr> <tr> <td><math>6m</math></td> <td><math>11m - 6</math></td> </tr> </table> | $m$   | $m - 1$   | $2m$ | $3m - 2$ | $3m$ | $5m - 3$ | $4m$ | $7m - 4$ | $5m$ | $9m - 5$ | $6m$ | $11m - 6$ | 2 | <p><b>B1</b> for row 4</p> <p><b>B1</b> for row 6</p> <p>If <b>0</b> scored, <b>SC1</b> for one correct column of 6 items</p> |
|  | $m$                                    | $m - 1$  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
|  | $2m$                                   | $3m - 2$   |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
|  | $3m$                                   | $5m - 3$   |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
|  | $4m$                                   | $7m - 4$   |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| $5m$   | $9m - 5$                               |  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| $6m$   | $11m - 6$                              |  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| (b) (i)  | $[s =] hm$ oe                          | 1  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| (b) (ii)   | $[r =] (2h - 1)m - h$ oe isw           | 1  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| (c)  | $[m =] \frac{s}{h}$                    | 1  |   |   |      |          |      |          |      |          |      |          |      |           |   |   |
| (d)  | $[r =] (2h - 1)\frac{s}{h} - h$ oe isw | 1FT  | <b>FT</b> substituting <i>their 4(c)</i> in <i>their 4(b)(ii)</i> |   |      |          |      |          |      |          |      |          |      |           |   |   |
| 5  | (a)                                    | $\frac{s}{h} = w$ oe   | 2   | <p><b>B1</b> can be implied by seeing substitution of <math>w = \frac{s}{h}</math> or <math>s = wh</math> in <i>their 4(d)</i></p>  |      |          |      |          |      |          |      |          |      |           |   |   |
|  | (b)                                    | $r = (2h - 1)w - h$<br>Yes, if $h = 17$ (only) oe  | 2   | <p><b>B1</b></p> <p><b>M1</b> for <math>544 = 2h^2 - 2h</math> with attempt to solve by factorisation, formula, sketch, completing the square, approximation or trial and improvement with three improving trials</p> <p>If <b>0</b> scored, <b>SC1</b> for 17 (without wrong working) or for Yes if 17 and -16</p> |      |          |      |          |      |          |      |          |      |           |   |   |
| Communication seen in one of <b>2(b)(ii)</b> , <b>3(b)(ii)</b> , <b>5(b)</b> |  |  | 1   |   |      |          |      |          |      |          |      |          |      |           |   |   |

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| B MODELLING |         |  |  |   |
|-------------|---------|--|--|---|
| 1           | (a)     | 8 points correctly plotted   | 2                                      | B1 for 6 or 7 correct   |
|             | (b) (i) | $y = x + 3$ oe   | 2                                      | M1 for $m = 1$ soi by, e.g. $y = x$   |
|             | (ii)    | 3  | 1                                      | C opportunity   |
| 2           | (a)     | $0 = 0^{[2]} + 0 + c$  | 1                                      |   |
|             | (b) (i) | $5 = 4a + 2b$ oe isw   | 1                                      |   |
|             | (ii)    | $8 = 25a + 5b$ oe isw  | 1                                      |   |
|             | (c)     | Equating coefficients soi<br>or<br>writing one equation correctly as $a =$ or $b =$<br><br>Combining <i>their</i> equations correctly to<br>eliminate one variable<br>or<br>substitution of $a$ or $b$<br><br>$a = -0.3$ or $b = 3.1$ oe<br><br><i>their</i> second variable correct | M1FT<br><br>M1FT<br><br>A1<br><br>B1FT | FT <i>their</i> 2(b) if coefficients not<br>equal<br><br><br>dep on both method marks<br><br>dep on one method mark<br>FT <i>their</i> first variable in one of<br><i>their</i> equations in 2(b)<br><br>If 0 scored, SC1 for $a = -0.3$ and<br>$b = 3.1$ or correct model without<br>working |
|             | (d)     | Parabola through (0, 0) with local maximum<br>seen   | 1                                      | C opportunity   |
|             | (e)     | Not valid oe and $y$ decreases soi by,<br>e.g max = 8<br>or<br>Valid oe for $[0 <] x < 5$ or less than max<br>or<br>Invalid oe for $x > 5$<br>or<br>Not valid oe and negative oe   | 1                                      | dep on mark in (d)  |

|               |  |                 |              |
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|  |            |  |          |   |
|--|------------|--|----------|---|
| <b>3</b>   | <b>(a)</b> | $5 = a2^b$ $8 = a5^b$ isw  | <b>1</b> |   |
|  | <b>(b)</b> | $\frac{8}{5} = \frac{a5^b}{a2^b}$ soi  | <b>1</b> |   |
|  | <b>(c)</b> | $\frac{\log 1.6}{\log 2.5}$ or $\log_{2.5} 1.6$<br>or $2.5^{0.513} = 1.6$<br>or $2.5^m =$ a value less than 1.6 with $2.5^n =$ a value more than 1.6 | <b>1</b> | $2.5^b = 1.6$ and $b = 0.513$<br>$0.45 \leq m < 0.5125\dots$<br>with<br>$0.5135\dots < n \leq 0.55$ . |
|  | <b>(d)</b> | $y = 3.5x^{0.5}$ oe  | <b>1</b> | Model must be written in full   |
|  | <b>(e)</b> | close fit or suitable oe   | <b>1</b> | <b>dep</b> on model in <b>(d)</b>   |
| Communication seen in one of <b>1(b)(ii)</b> , <b>2(d)</b> |            |  | <b>1</b> |   |