**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**Cambridge International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2015 series

# 0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

**0607/31** Paper 3 (Core), maximum raw mark 96

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.

Cambridge will not enter into discussions about these mark schemes.

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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 |

| | | | | |
|---|---|---|---|---|
| **1** | **(a)** | 2, 3, 6, 9 | **1** | |
| | **(b) (i)** | 26 | **1** | |
| | **(ii)** | 300.763 | **1** | |
| | **(iii)** | 12.8 or 12.76… | **2** | **B1** for 37.4 seen |
| | **(c) (i)** | 807.54 cao | **1** | |
| | **(ii)** | 807.5 cao | **1** | |
| | **(iii)** | 810 cao | **1** | |
| | **(iv)** | 800 cao | **1** | |
| **2** | | $a = 48$<br>$b = 44$<br>$c = 44$<br>$d = 88$ | **1**<br>**1**<br>**1 FT**<br>**1 FT** | <br><br>**FT** *their* **(b)**<br>**FT** 180 – 48 – *their* 44<br>or 180 – *their* **(a)** + *their* **(b)** |
| **3** | **(a)** | 36 | **2** | **M1** for 25 or 4 seen |
| | **(b)** | 17.8 or 17.77… | **3** | **M2** for $\frac{5300-4500}{4500}\times 100$ oe<br>or **M1** for $\frac{5300-4500}{4500}$ or $\frac{5300}{4500}\times 100$ |
| **4** | **(a) (i)** | 19.2 | **1** | |
| | **(ii)** | 18.4 | **1** | |
| | **(b)** | 0.5<br>0.4 | **1**<br>**1** | If 0 scored **SC1** if reversed |
| | **(c)** | 64<br>64 | **1**<br>**1** | |
| | **(d)** | 147.2[0] | **2 FT** | **M1** for *their* 64 × [0].95 and *their* 64 × 1.35 oe |

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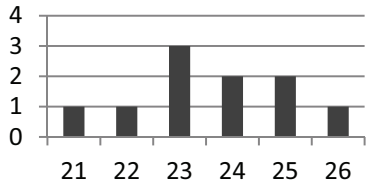
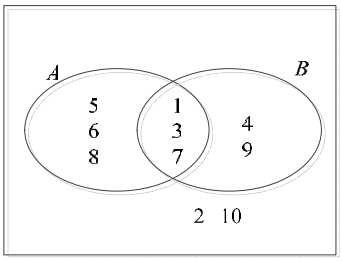
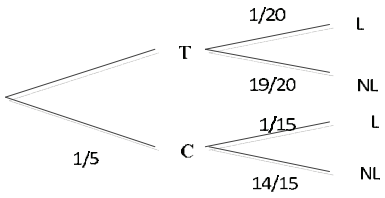
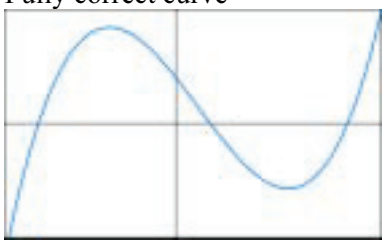
|---|---|---|---|---|
| **5** | **(a) (i)** | 5 | **1** | |
| | **(ii)** | 23 | **1** | |
| | **(iii)** | 23.5 oe | **1** | |
| | **(iv)** | 23.6 | **1** | |
| | **(b)** |   | **2** | **B1** for 4 correct bars |
| **6** | **(a)** | 150 | **1** | |
| | **(b)** | 300 | **1 FT** | **FT** *their* **(a)** × 2 |
| | **(c)** | [0].65 | **2** | **M1** for 2 × 1.45 + [0].7[0] or better |
| | **(d)** | [0].75 | **1** | |
| **7** | **(a)** | $F + 2M$ | **2** | **B1** for $2M$ seen |
| | **(b)** | 15 | **2 FT** | **M1** for correct substitution in *their* formula |
| | **(c)** | 9 | **2 FT** | **M1** for correct substitution in *their* formula |
| **8** | **(a)** |   | **2** | **B1** for 2 correct regions |
| | **(b) (i)** | 1 3 7 | **1 FT** | |
| | **(ii)** | 2 10 | **1 FT** | |
| | **(iii)** | 4 9 | **1 FT** | |
| | **(c) (i)** | $\frac{5}{10}$ oe | **1** | |
| | **(ii)** | $\frac{3}{10}$ oe | **1** | |
| | **(iii)** | $\frac{4}{10}$ oe | **1** | |

| | | | | |
|---|---|---|---|---|
| **9** | **(a)** | 33<br>46 | **1**<br>**1** | |
| | **(b)** | $n^2 - 3$ | **3** | **B2** for $n^2 \pm k$<br>or **M1** for finding second differences or any quadratic |
| **10** | **(a)** |  | **3** | **B1** for each branch |
| | **(b)** | $\frac{4}{100}$ oe | **2** | **M1FT** for $\frac{4}{5} \times \textit{their} \frac{1}{20}$ |
| | **(c)** | $\frac{71}{75}$ or 0.947 or 0.9466… | **3** | **M2** for $\frac{4}{5} \times \textit{their}\ \frac{19}{20} + \textit{their}\ \left(\frac{1}{5} \times \frac{14}{15}\right)$<br>or **M1** for $\frac{4}{5} \times \textit{their}\ \frac{19}{20}$ or $\textit{their}\ \left(\frac{1}{5} \times \frac{14}{15}\right)$ |
| **11** | **(a)** | Vertices at<br>(3, 1) (3, 2)<br>(4, 2) (4, 4)<br>(5, 4) (5, 1) | **2** | If 0 scored **SC1** for reflection in<br>$y = 1$ or $x = 0$ |
| | **(b)** | Vertices at<br>(–5, –2) (–3, –1)<br>(–4, –1) (–4, 1)<br>(–5, –1) (–3, –2) | **2** | If 0 scored **SC1** for translation of<br>$\begin{pmatrix} -2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -3 \end{pmatrix}$ or $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$ |
| | **(c)** | Vertices at<br>(1, –1) (1, –2)<br>(2, –2) (3, –1)<br>(2, –4) (3, –4) | **2** | If 0 scored **SC1** for any rotation about (0, 0) or a rotation of 180° |
| **12** | **(a)** | Points plotted correctly | **2** | **B1** for each point |
| | **(b)** | (5, 0) | **2** | **B1** for each co-ordinate<br>If 0 scored **SC1** for (0, 5) |
| | **(c)** | 8.49 | **3** | **M1** for $\sqrt{6^2 + 6^2}$ or better<br>**A1** for 8.485 to 8.486 |
| | **(d)** | $-1$ | **2** | **M1** for $\frac{\text{rise}}{\text{run}}$ |
| | **(e)** | $y = -x + 5$ oe | **2 FT** | **M1** for $[y =] -x + k$ or $x + y = k$<br>**FT** from **(d)** |

| | | | | |
|---|---|---|---|---|
| **13** | **(a)** | 72 | **1** | |
| | **(b)** | 108 | **2** | **M1** for $\frac{2(180 - \textit{their } 72)}{2}$ or $180 - \frac{360}{5}$ oe<br>or **B1** for 54 |
| | **(c)** | 4.13 or 4.129… | **2 FT** | **M1** for $\tan 54 = \frac{r}{3}$ oe **FT** $\frac{\textit{their} \text{ angle in } (\mathbf{a})}{2}$<br>or $\frac{\text{angle in } (\mathbf{b})}{2}$ |
| | **(d)** | 61.9 – 62.[0] | **3 FT** | **M2** for $\left(\frac{1}{2} \times 6 \times \textit{their } 4.13\right) \times 5$<br>or **M1** for $\frac{1}{2} \times 6 \times \textit{their } 4.13$ |
| **14** | **(a)** | Fully correct curve<br>  | **2** | **B1** for correct cubic shape (maximum then minimum) |
| | **(b) (i)** | (–4, 0) (1, 0) (5,0) | **2** | **B1** for 2 correct |
| | **(ii)** | (0, 10) | **1** | |
| | **(iii)** | (3.27, –14.3)<br>or (3.270.., –14.28 to –14.27) | **2** | **B1** for each co-ordinate |