**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the May/June 2012 question paper

# for the guidance of teachers

# 0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

**0607/23** Paper 2 (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.

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|---|---|---|---|---|
| **1** | **(a)** | $(\pm)\frac{1}{7}$ (0.1528…) | **1** | Accept $-\frac{1}{7}$ (–0.1528...) |
| | **(b)** | $\pm\frac{1}{2}$ (± 0.5) | **2** | **M1** for $x^2 = \frac{1}{4}$ soi **[3]** |
| **2** | **(a)** | $(3x - 2)(2x + 1)$ | **2** | **SC1** for a pair of brackets which multiply out to give 2 terms correct |
| | **(b)** | $\frac{2}{3}, -\frac{1}{2}$ | **1ft** | ft from their **(a)** only if **SC1** scored in **(a)**. Strict ft but can start again to achieve correct answer and score. **[3]** |
| **3** | **(a)** | $\begin{pmatrix}13\\-9\end{pmatrix}$ | **2** | **B1** for $\begin{pmatrix}13\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-9\end{pmatrix}$ seen |
| | **(b)** | $\sqrt{13}$ isw | **2** | **B1** for $2^2 + 3^2$ seen or implied by $\pm\sqrt{13}$ **[4]** |
| **4** | | 56, 92 | **2** | **B1** for 56, **B1** for 92<br>After B0, B0, award SC1 for 25 and 36 seen. **[2]** |
| **5** | **(a)** | $(q - y)(p - x)$ oe | **2** | **B1** for $p(q - y) + x(y - q)$ or better, or $q(p - x) + y(x - p)$ or better |
| | **(b)** | $2(4c - 5d)(4c + 5d)$ | **2** | **B1** for $2(16c^2 - 25d^2)$ or $(8c - 10d)(4c + 5d)$ or $(4c - 5d)(8c + 10d)$ **[4]** |
| **6** | **(a) (i)** | 3 | **1** | |
| | **(ii)** | 180° or $\pi$ | **1** | |
| | **(b)** | $y = 3\sin 2x$ drawn | **B2** | After **B0,**<br>**SC1** for any wave with correct amplitude or *their* amplitude<br>**and**<br>**SC1** for wave passing through (0,0) with correct period or *their* period **[4]** |
| **7** | | $p = -1$, $q = 2.5$ or 5/2 | **4** | **M1** for attempt to get 2 equations for elimination. Condone 1 numerical slip<br>**M1** for correct addition/subtraction of *their* equation. Condone 1 further numerical slip (dep)<br>A1, A1 for each **Or**<br>**M1** for equation in form $x =$ or $y =$. Condone 1 numerical slip<br>**M1** for substitution of *their* equation into the other correctly. No further slip<br>A1, A1 for each<br>**Or wwwSC3** for either $p = -1$ or $q = 2.5$ **[4]** |
| **8** | | $x = 5$ | **3** | **M2** for $y = 12x^2$ **or** $\frac{108}{300} = \frac{3^2}{x^2}$ oe<br>**M1** for $y = kx^2$ $(k \neq 1)$ **[3]** |

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|---|---|---|---|---|
| **9** | | 13.5 | **3** | **B1** for total distance = 27km<br>**B1** for total time = 2 hours **[3]** |
| **10** | | $x = -5$ | **3** | **M1** for multiplying all 3 terms by 14, or LHS over 14 = 1, or all over 14<br>**A1** for $2(x + 3) - 3(x - 1) = 14$,<br>or $\frac{2x + 6 - 3(x-1)}{14} = 1$ oe<br>with other denominator e.g. 98<br>–5 may be seen embedded **[3]** |
| **11** | **(a)** | log 6 | **1** | |
| | **(b)** | $3^y$ | **1** | |
| | **(c)** | 3 | **1** | Accept ±3 or –3 **[3]** |
| **12** | **(a)** | $-\frac{1}{2}$ oe | **1** | isw (incorrect cancelling only) |
| | **(b)** | For co-ordinates of $D = (2, 4)$ | **M1** | |
| | | For gradient of $CD = \frac{6}{4}$ oe<br>e.g. ('4' – –2)/('2' – –2) | **M1** | Can imply previous M1<br>i.e. Correct method using their D |
| | | Gradients not negative reciprocals oe | **E1** | Dep on M2 and no errors in **(b)** [4] |