**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the May/June 2014 series

## 0580 MATHEMATICS

**0580/32** Paper 3 (Core), maximum raw mark 104

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

| Qu | | Answers | Mark | Part Answers |
|---|---|---|---|---|
| 1 | **(a) (i)** | 5 and 9 cao | **1** | |
| | **(ii)** | 4 and 9 cao | **1** | |
| | **(iii)** | 8 cao | **1** | |
| | **(iv)** | 2 and 5 cao | **1** | |
| | **(b)** | < = < > | **2** | **B1** for 3 correct |
| | **(c) (i)** | $(16 + 8) \div 4 - 2 = 4$ | **1** | |
| | **(ii)** | $16 + 8 \div (4 - 2) = 20$ | **1** | |
| | **(d) (i)** | $2 \times 2 \times 3 \times 7$ | **2** | **B1** for 2, 3, 7 or 2, 2, 3, 7, or $1 \times 2 \times 2 \times 3 \times 7$ |
| | **(ii)** | 12 | **2** | **B1** for 2, 3, 4 or 6 or $2 \times 2 \times 3$ or $2^2 \times 3$ or $4 \times 3$ or $2 \times 6$ seen as ans |
| | **(iii)** | 168 | **2** | **B1** for any other multiple of 168 or $2 \times 2 \times 2 \times 3 \times 7$ oe |
| | **(e) (i)** | 19 | **1** | any other terms must be correct |
| | **(ii)** | +4 oe | **1** | e.g. add 4 |
| | **(iii)** | $4n - 1$ oe final answer | **2** | **B1** for $4n + k$ , $qn - 1$ $q \neq 0$ |
| | **(iv)** | accept any correct statement | **1** | |

| | | | | |
|---|---|---|---|---|
| **2** | **(a) (i)** | Trapezium | **1** | |
| | **(ii)** | 25 200 | **2** | **SCB3** for 2.52 $m^2$<br>**M1** for $\left(\frac{180+240}{2}\right) \times 120$<br>or $180 \times 120 + \frac{1}{2} \times 120 \times 60$<br>or $\left(\frac{1.8+2.4}{2}\right) \times 1.2$ or $1.8 \times 1.2 + \frac{1}{2} \times 1.2 \times 0.6$ oe |
| | | $cm^2$ | **1** | |
| | **(iii)** | 6.3 | **2** | **M1** for *their* **(a)(ii)** × 2.5 oe or figs 63 |
| | **(iv)** | 134 or 134.1 to 134.2 | **3** | **B1** for 60 seen on diagram or used<br>**M1** for $120^2$ + (their '240 – 180')$^2$ or better |
| | **(b)** | correct angle bisector of angle *J* with two pairs of supporting arcs | **2** | **M1** for the correct angle bisector of angle *J* without arcs |
| | | arc centre *H* radius 4 cm | **2** | **M1** for any arc centre *H* |
| | | correct region shaded | **1** | dep on at least both M marks |
| **3** | **(a)** | correct mirror line | **1** | |
| | **(b)** | 2 | **1** | |
| | **(c) (i)** | 131 | **1** | |
| | **(ii)** | 103 | **2** | **M1** for 180 – 49 – 54 or 49 + 54 or 77 seen or fully correct method |
| | **(d)** | 56 | **2** | **M1** for 180 – 90 – 34 or better or indication of angle *B* = 90 |
| | **(e)** | 9 with supporting working | **5** | **M2** for internal angle of P =120<br>or **M1** for 180 – (360 ÷ 6) or (6 – 2) × 180 ÷ 6<br>**M1FT** for 360 – their '120' – 100 [= 140]<br>**M1FT** for 360 ÷ (180 – their '140')<br>if **M0** then answer of 9 scores **SC2** |

| | | | | |
|---|---|---|---|---|
| **4** | **(a) (i)** | 2 | **1** | |
| | **(ii)** | 4 and a half circles | **1FT** | FT is 9 / *their* **a(i)** if *their* **a(i)** is an integer |
| | **(b) (i)** | 1 | **1FT** | |
| | **(ii)** | 2 cao | **1** | |
| | **(iii)** | 6 cao | **1** | |
| | **(iv)** | $\frac{13}{46}$ oe isw | **2** | **M1** for 13 seen or (6 + 5 + 2) / 46 or $6\frac{1}{2}$ / 23 |
| | **(c) (i)** | four points correctly plotted | **2** | **M1** for 3 points correctly plotted |
| | **(ii)** | continuous ruled line of best fit | **1** | dependent on at least 9 points on graph |
| | **(iii)** | positive | **1** | |
| | **(iv)** | 65 to 70 | **1FT** | |
| | **(v)** | E | **1** | **FT** their continuous ruled line of best fit if positive |
| **5** | **(a) (i)** | 461.7(0) cao | **1** | |
| | **(ii)** | 397.06 or 397.1 or 397 or 397.062 | **2FT** | **M1FT** for *their* **(a)(i)** × 0.86 oe soi |
| | **(iii)** | 6880 or 6882 or 6882.(…) | **2FT** | **M1FT** for *their* **(a)(ii)** ÷ 3 soi or *their* **(a)(ii)** × 52 soi |
| | **(iv)** | 84 | **2** | **M1** for 140 × 3 ÷ (3 + 2) |
| | **(b)** | 124 cao | **3** | **B2** for 124.3(…….) or 124.4<br>if **B0** then **M1** for 10 000 ÷ 80.4<br>**B1** for rounding their answer, if decimal, to the nearest integer |
| **6** | **(a)** | 5 12 | **2** | **B1**, **B1** |
| | **(b)** | 9 points plotted correctly | **3FT** | **B2FT** for 7 or 8 points correctly plotted<br>**B1FT** for 5 or 6 points correctly plotted |
| | | correct smooth curve through all 9 correct points | **1** | |
| | **(c)** | correct ruled line | **1** | minimum length must touch *y* axis and curve |
| | **(d)** | 2.7 to 2.8 | **1FT** | FT their curve and ruled line |

| | | | | |
|---|---|---|---|---|
| **7** | **(a)** | $13p - r$ Final Answer | **2** | **B1** for either $13p$ or $-r$ in the answer or $13p - r$ spoilt |
| | **(b)** | 198 | **2** | **M1** for $12 \times 16 - 2 \times -3$ or **B1** for 192 or + 6 or – (–6) seen |
| | **(c) (i)** | $6.4$ or $6\frac{2}{5}$ | **1** | |
| | **(ii)** | –3 | **2** | **M1** for first correct step, i.e. $5b = 8 - 23$ or better, or $b + \frac{23}{5} = \frac{8}{5}$ or better |
| | **(iii)** | –9 | **3** | **B1** for $2c - 20$<br>**M1FT** for correctly collecting $c$s on one side and numbers on the other, e.g. $5c - 2c = -7 - 20$ or better |
| | **(d) (i)** | $16x + 24$ | **1** | |
| | **(ii)** | $6x\,(x - 2)$ | **2** | **B1** for $x(6x - 12)$, $6(x^2 - 2x)$, $2(3x^2 - 6x)$, $3(2x^2 - 4x)$, $2x\,(3x - 6)$ or $3x(2x - 4)$ |
| | **(e) (i)** | $15q^6$ | **2** | **B1** for $15q^n$ ($n$ not 0) or $kq^6$ ($k$ not 0) |
| | **(ii)** | $t^6$ | **1** | |
| **8** | **(a) (i)** | $\begin{pmatrix} 10 \\ -15 \end{pmatrix}$ | **1** | |
| | **(ii)** | $\begin{pmatrix} 7 \\ -6 \end{pmatrix}$ | **1** | |
| | **(b)** | $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$ | **1** | |
| | **(c)** | (3,1) | **1** | |
| **9** | **(a) (i)** | correct reflection at (1,–1), (3,–1) and (3,–5) | **1** | |
| | **(ii)** | correct rotation at (–1,–1), (–3,–1) and (–3,–5) | **2** | **SC1** for correct rotation any centre |
| | **(iii)** | correct translation at (–4,4), (–2,4) and (–2,8) | **2** | **B1** for one direction correct, i.e. 5 left or 3 up |
| | **(b)** | enlargement<br>[ centre ] (0,1)<br>[ scale factor] 2 | **1**<br>**1**<br>**1** | |