**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

**MATHEMATICS** **0580/33**

Paper 3 (Core) **May/June 2016**

MARK SCHEME

Maximum Mark: 104

**Published**

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.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.



© UCLES 2016

| Page 2 | Mark Scheme | Syllabus | Paper |
|---|---|---|---|
| | Cambridge IGCSE – May/June 2016 | 0580 | 33 |

**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

| Question | Answer | Mark | Part marks |
|---|---|---|---|
| 1 (a) (i) | 11 ÷ (11 + 14 + 5) × 18 | 1 | |
| (ii) | [paths] 8.4<br>[buildings] 3[.0] | 1<br>1 | |
| (b) | [Mammals] 4.2<br>[Reptiles] 1.98 | 1<br>1 | |
| (c) (i) | 7 [h] 45 [min] | 1 | |
| (ii) | 55 [h] 45 [min] | 2FT | **B1** for 55.75 seen or 38 [h] 45 [min] or 17 [h] soi<br>or<br>**M1FT** for 5 × *their* (c)(i) + 2 × 8 [h] 30 [min] or better |
| (d) (i) | [$] 48[.00] | 2 | **M1** for 2 × 11 + 2 × 9.25 + 7.50 or better<br>If M0 then **SC1** for 55.50 |
| (ii) | 12.5 | 3FT | **M2** for $\frac{their(d)(i)-42}{their(d)(i)}$[×100] or<br>$\left(100-(\frac{42}{their(d)(i)}\times 100)\right)$<br>or<br>**M1** for $\frac{42}{their(d)(i)}$ or figs 875<br>or<br>**B1** for *their (d)(i)* – 42 or *their* 6 seen |
| 2 (a) (i) | 10 | 2 | **M1** for 360 ÷ 36 |
| (ii) | 144 | 1 | |
| (iii) | 1440 | 1FT | *their* (a)(i) × *their* (a)(ii) |

© Cambridge International Examinations 2016

| Question | Answer | Mark | Part marks |
|---|---|---|---|
| (b) (i) | 5.5 or $5\frac{1}{2}$ | 1 | |
| (ii) | Translation | 1 | |
| | $\begin{pmatrix}-3\\-8\end{pmatrix}$ | 1 | |
| (iii) (a) | Correct reflection | 2 | **B1** for reflection in $x = k$ or reflection in $y = 2$ |
| (iii) (b) | Correct enlargement | 2 | **B1** for correct scale factor and orientation but incorrect centre |
| 3 (a) (i) | 754 or 753.9 to 754.1 | 2 | **M1** for $\pi \times 4^2 \times 15$ or better |
| | $cm^3$ or cubic centimetres | 1 | Independent mark |
| (ii) | 427 or 427.2 to 427.312 | 2 | **M1** for $2 \times \pi \times 4 \times 15 + \pi \times 4^2$ or better |
| (b) | $\frac{A-\pi r^2}{2\pi r}$ oe final answer | 2 | **B1** for $A - \pi r^2 = 2\pi rh$ or better<br>or<br>$\frac{A}{2\pi r} = h + \frac{\pi r^2}{2\pi r}$ or better |
| (c) | $\pi r(2h + r)$ final answer | 2 | **B1** for $\pi(2rh + r^2)$ or $r(2\pi h + \pi r)$ |
| (d) (i) | 2 : 3 | 1 | |
| | 2 : 3 | 1 | Accept 1 : 1.5 or $\frac{2}{3}$ : 1 |
| (ii) | Similar | 1 | |
| 4 (a) | 5 bars correct heights and equal widths | 2 | **B1** for 4 bars correct height and equal widths<br>or<br>5 bars of correct height |
| (b) | 2010 | 1 | |
| (c) (i) | 2180 | 1 | |
| (ii) | 2040 | 2 | **B1** for ordering at least 4 or identifying the middle two |
| (iii) | 1970 | 2 | **M1** for (920 + 1070 + 3100 + 2240 + 2650 + 1840) ÷ 6<br>or 11820 ÷ 6 |

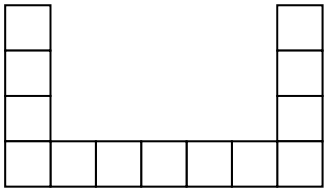
© Cambridge International Examinations 2016

| Question | Answer | Mark | Part marks |
|---|---|---|---|
| 5 (a) (i) | −4 −16 8 1 | 2 | **B1** for 3 correct |
| (ii) | Completely correct curve | 4 | **B3FT** for 9 or 10 correctly plotted<br>**B2FT** for 7 or 8 correctly plotted<br>**B1FT** for 5 or 6 correctly plotted |
| (b) | 2 | 1 | |
| (c) (i) | Ruled line $y = x$ drawn | 1 | Must at least intersect the graph in two places |
| (ii) | $y = x$ oe | 1 | |
| (d) | Continuous ruled line $y = 7$ drawn | 1 | Must intersect the graph |
| | 2.1 to 2.5 | 1FT | |
| 6 (a) (i) | 57 | 1 | |
| (ii) | 48 | 1 | |
| (iii) | 50 | 1 | |
| (iv) | 53 | 1 | |
| (v) | 63 | 1 | |
| (vi) | 64 | 1 | |
| (vii) | 49 | 1 | |
| (viii) | Any three from<br>41 43 47 53 59 61 67 | 2 | **B1** for 2 correct and at most one error |
| (b) | $2 \times 3^2 \times 13$ or $2 \times 3 \times 3 \times 13$ | 2 | **B1** for 2, 3 and 13 only identified as factors<br>or<br>for a correct product eg $2 \times 9 \times 13$ , $18 \times 13$ |
| (c) (i) | $3^{11}$ | 1 | |
| (ii) | 177 147 | 1 | |
| (iii) | $1.77[147] \times 10^5$ | 1FT | follow through *their* (c)(ii) |
| (d) (i) | $\frac{1}{9}$ | 1 | |
| (ii) | 3 | 1 | |

© Cambridge International Examinations 2016

| Question | Answer | Mark | Part marks |
|---|---|---|---|
| 7 (a) | 48 to 52 | 1 | |
| (b) (i) | Correct ruled angle bisector with 2 pairs of correct arcs | 2 | **B1** for accurate with no / one pair of arcs<br>or<br>**M1** for 2 pairs of correct arcs with no / wrong line |
| (ii) | 270 to 278 | 2FT | **B1** for 13.5 ± 0.2 [cm] seen in working<br>or<br>**B1FT** for *their* line from *E* ± 0.2cm to outside |
| (iii)(a) | 9 × 1000 ÷ ( 60 × 60 ) | 1 | |
| (iii)(b) | 108 to 111.2 | 2FT | **M1**FT for *their* (b)(ii) ÷ 2.5 |
| (c) | Correct ruled perpendicular bisector of *DE* with 2 pairs of arcs | 2 | **B1** for accurate with no / one pair of arcs<br>or<br>**M1** for correct intersecting arcs with no / wrong line |
| (d) (i) | Arc centre *A*, radius 7.5 from *AB* to *AE* | 2 | **B1** for centre *A*, incorrect radius<br>or correct arc too short |
| (ii) | Correct region shaded | 1FT | follow through provided an area is possible |
| 8 (a) | Isosceles | 1 | |
| (b) (i) | 73 | 1 | |
| (ii) | 15 | 1FT | FT is 180 – (73 + 19 + *their* (b)(i)) |
| (iii) | 90 | 1 | |
| (iv) | 19 | 1 | |
| (v) | 71 | 2 | **M1** for [angle *CAF* = ] 90 – 19<br>or<br>**B1** for angle *CAF* = 90° soi |
| (c) | 40.8 **cao** | 3 | **B2** for 40.84…..<br>or<br>**M1** for 13π oe seen in the working<br><br>**B1 independent** for rounding their circumference correctly if to more than 1 d p |

© Cambridge International Examinations 2016

| Question | Answer | Mark | Part marks |
|---|---|---|---|
| 9 (a) | Cube | 1 | |
| (b) (i) |  | 1 | |
| (ii) | 13 | 1 | |
| | 17 | 1 | If 0 scored **SC1** for second number 4 more than the first |
| (iii) | $4n - 3$ oe final answer | 2 | **B1** for $4n - j$ or $kn - 3$ ( $k \neq 0$ ) |
| (iv) | 73 | 1FT | follow through linear expressions in (b)(iii) |
| (v)(a) | 25 | 2 | **B1FT** for *their* (b)(iii) = 98<br>or<br>**B1** for 25.25 |
| (v)(b) | 1 | 1FT | follow through *their* (b)(v)(a) if an integer |

© Cambridge International Examinations 2016