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

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

Paper 3 (Core) **May/June 2019**

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.

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## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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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

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 1(a) | 1 302 596 | **1** | |
| 1(b)(i) | −5<br>−7 | **2** | **B1** for −7<br>**B1FT** for 2 + *their* −7 |
| 1(b)(ii) | −180<br>−15 12 | **3** | **B1** for −15<br>**B1** for 12<br>and **B1FT** for *their* −15 × *their* 12 |
| 1(c) | $1.83 \times 10^{-1}$ 18.4% $\frac{5}{27}$ $5^{-1}$ | **2** | **M1** for 3 in correct order or for<br>three of [$\frac{5}{27}$ =]0.185.... , [18.4% =] 0.184,<br>[$1.83 \times 10^{-1}$ =] 0.183, [$5^{-1}$=] 0.2 |
| 1(d) | 46.7 or 46.71... | **1** | |
| 1(e)(i) | 14 | **2** | **B1** for answer of 2 or 7 or 2 × 7<br>or 2 × 2 × 7 and 2 × 7 × 7<br>or list (28 =) 2, 2, 7 and (98 =)2, 7, 7 |
| 1(e)(ii) | 196 | **2** | **B1** for 28, 56, 84, 112,… and 98, 196<br>or [1 ×]2 × 2 × 7 × 7<br>or 196*k* |
| 1(f) | 3880 or 3879[·…]<br>or 3.88(0...) × $10^3$ or 3.879… × $10^3$ | **2** | **M1** for $2.25 \times 10^8 \div 5.8 \times 10^4$ oe<br>or figs (388 or 3879…) as the answer |
| 2(a) | Trapezium | **1** | |
| 2(b)(i) | 16 or 15.8 to 16.2 | **1** | |
| 2(b)(ii) | 14 | **1** | |
| 2(c)(i) | Translation<br>$\begin{pmatrix}-9\\-8\end{pmatrix}$ | **2** | **B1** for each |
| 2(c)(ii) | Rotation<br>90° clockwise oe<br>[about] (0, 0) oe | **3** | **B1** for each |

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 2(d)(i) | Correct shape<br>Vertices<br>(−1, 4), (−1, 6), (−5, 6), (−5, 1) | **2** | **B1** for reflection in $x = k$ or $y = 1$ |
| 2(d)(ii) | Correct shape<br>Vertices<br>(3, 0.5), (3, 3), (1, 3), (1, 2) | **2** | **B1** for any enlargement, SF $\frac{1}{2}$ with different centre |
| 3(a) | 12 : 5 : 4 | **2** | **B1** for 36 : 15 : 12 oe |
| 3(b)(i) | $\frac{9}{(9+2+1)} \times 36$ | **1** | |
| 3(b)(ii) | [Cellos] 6<br>[Double basses] 3 | **2** | **B1** for each |
| 3(c) | 8 | **2** | **B1** for 3 [oboes] seen |
| 3(d) | 5 | **2** | **B1** for 4 [trumpets] seen |
| 3(e)(i) | [Woodwind] 3255<br>[Brass] 2652 | **1** | |
| 3(e)(ii) | 10 623 | **1** | **FT** *their* **(e)(i)** |
| 3(f) | 3718.05 | **2** | **M1** for (1 – 0.65) × *their* **(e)(ii)** oe |
| 4(a) | −3 5 2 | **2** | **B1** for 2 correct |
| 4(b) | Correct curve | **4** | **B3FT** for 6 or 7 points correct<br>**B2FT** for 4 or 5 points correct<br>**B1FT** for 2 or 3 points correct |
| 4(c)(i) | Ruled line $x = 1$ drawn | **1** | |
| 4(c)(ii) | $x = 1$ | **1** | |
| 4(d) | −0.5 to −0.3 and 2.3 to 2.5 | **2** | **B1** for each<br>If 0 scored, **B1** for $y = 4$ drawn |
| 4(e)(i) | Correct ruled continuous line | **1** | |
| 4(e)(ii) | $[y =] 2x + 4$ | **3** | **B2** for $[y =] 2x + k$<br>or **M1** for $\frac{\text{rise}}{\text{run}}$<br>**B1** for $kx + 4$ , $k \neq 0$, or $c = 4$ |
| 5(a) | 10.8 to 12 | **2** | **B1** for 3.6 cm to 4.0 cm measured |
| 5(b) | 191 to 220 | **3** | **B1** for 11.8 to 12.2 measured or 35.4 to 36.6<br>**M1** for 0.5 × *their* **(a)** × *their* actual *EC* oe |

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| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 5(c) | Correct ruled bisector of angle *BCD* with correct arcs | **2** | **B1** for correct angle bisector with no/incorrect arcs,<br>or two pairs of supporting arcs<br>or correct line short of *AB* with or without arcs |
| 5(d)(i) | 25.1 or 25.13 to 25.14 | **2** | **M1** for $8 \times \pi$ oe |
| 5(d)(ii) | 50.3 or 50.26 to 50.272 | **2** | **M1** for $\pi (0.5 \times 8)^2$ oe |
| 6(a)(i)(a) | 34<br>Isosceles [triangle] | **2** | **B1** for each |
| 6(a)(i)(b) | *Their p*<br>Alternate [angles] | **2** | **B1** for each |
| 6(a)(ii) | [*r* =] 112<br>[*s* =] 56 | **2** | **B1** for 180 − 34 − *their* **(a)(i)(a)**<br>**B1** for 90 − *their* **(a)(i)(b)** |
| 6(a)(iii) | 34<br>Corresponding [angles]<br>or angles [on a straight] line [add up to] 180 | **2** | **B1** for each |
| 6(b) | 90<br>Angle [between] tangent [and] radius (or diameter) | **2** | **B1** for each |
| 7(a)(i) | 120 | **2** | **M1** for 90 ÷ *their* time for *A* to *B* [× 60]<br>or **B1** for 2[km/min] |
| 7(a)(ii) | 10 | **1** | |
| 7(a)(iii) | Ruled line from (14 40, 90)<br>to (15 20, 155) | **1** | |
| 7(a)(iv) | *A* [and] *B* | **1** | |
| 7(b)(i) | 2 [hours] 30 [minutes] | **2** | **M1** for 155 ÷ 62 |
| 7(b)(ii) | 15 15 | **1** | **FT** *their* **(b)(i)** + 12 45 |
| 7(b)(iii) | Ruled line from (12 45, 155) to (*their*7**(*b*)(*ii*)**, 0) | **1** | |
| 7(b)(iv) | 58 to 63 | **1** | **FT** *their* crossing point |
| 8(a)(i) | Correct frequencies<br>8 5 3 5 2 1 | **2** | **B1** for 1 frequency incorrect<br>or 2 incorrect but total still 24<br>or 8 5 3 5 2 1 in tally column<br><br>If 0 scored, **B1** for completely correct tallies |
| 8(a)(ii) | 1 | **1** | |

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 8(a)(iii) | 5 | **1** | |
| 8(a)(iv) | 2 | **1** | |
| 8(a)(v) | 2.625 | **3** | **M1** for $\sum fx$<br>$1 \times 8 + 2 \times 5 + 3 \times 3 + 4 \times 5 + 5 \times 2 + 6 \times 1$<br><br>**M1** dep for *their* $\sum fx \div 24$ |
| 8(a)(vi) | $\frac{5}{24}$ oe | **1** | **FT** *their* table |
| 8(b) | Correct bar chart | **2** | **B1** for 2 or 3 correct bars<br>or for all 4 heights correct |
| 8(c) | Correct generalised comparison | **1** | |
| 9(a) | 23 | **4** | **M3** for $2 \times 32.4 + 4 \times 24.4 - 115 - 24.4$ oe<br>OR<br>**B2** for 162.4[0] or $2 \times 32.4 + 4 \times 24.4$ oe<br>or **M1** for $2 \times 32.4$ or $4 \times 24.4$<br><br>**B1** for 139.4[0] |
| 9(b) | 4 [h] 55[min] | **1** | |
| 9(c) | 75 | **2** | **M1** for $318 \div 4.24$ |

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