**MATHEMATICS** **0580/32**

Paper 3 (Core) **March 2019**

MARK SCHEME

Maximum Mark: 104

**Published**

This document consists of **7** printed pages.

## 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.

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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.

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GENERIC MARKING PRINCIPLE 2:

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

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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.

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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.

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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).

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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.

**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)(i) | Swimming | 1 | |
| 1(a)(ii) | $\dfrac{72}{360}$ oe | 1 | |
| 1(a)(iii) | 5 cao | 2 | **M1** for $\dfrac{30}{360}[\times 60]$ or $\dfrac{60}{360}[\times 30]$ <br><br> or for $\dfrac{360}{60}$ soi by 6 |
| 1(a)(iv) | $\dfrac{55}{60}$ oe | 1 | **FT** $\dfrac{60 - their\,\mathbf{(a)(iii)}}{60}$ oe |
| 1(a)(v) | Tennis, Judo | 1 | |
| 1(b) | 2 sectors drawn: <br> Running 60° <br> Swimming 132° | 2 | **M1** for use of 12° implied by 60° or 132° seen or for 10 [boys] or 22 [boys] seen |
| 1(c) | A valid correct similarity and difference | 2 | **B1** for each |
| 2(a) | $\dfrac{4}{15}$ cao | 2 | **M1** for $\dfrac{8}{30}$ |
| 2(b) | $\dfrac{7k}{12k}$ $k \neq 1$ | 1 | |
| 2(c) | $\dfrac{11k}{13k}$ | 1 | |
| 2(d) | Any correct fraction | 1 | |
| 2(e) | $5.7 \times 10^{-1}$, $\dfrac{4}{7}$, 57.2% , $\sqrt{0.33}$ | 2 | **B1** for 3 in correct order <br> **M1** for 3 of 0.57, 0.571[….], 0.574[….], 0.572 |

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 3(a) | 6 : 5 : 4 | **2** | **M1** for 1200 : 1000 : 800 or better |
| 3(b) | 204 000 | **2** | **M1** for $240000 \times \left(1 - \dfrac{15}{100}\right)$ oe |
| 3(c) | 832 or 831.5 or 831.53 or 831.54 or 831.538… | **3** | **M2** for $750 \times \left(1 + \dfrac{3.5}{100}\right)^3$ oe <br><br> or **M1** for $750 \times \left(1 + \dfrac{3.5}{100}\right)^2$ oe |
| 4(a) | 800 | **2** | **M1** for $\dfrac{10}{10+1}[\times 880]$ or $\dfrac{880}{10+1}[\times 10]$ oe |
| 4(b) | 220 | **1** | |
| 4(c) | $\dfrac{31}{40}$ or equivalent fraction | **3** | **M2** for $1 - \left(\dfrac{1}{40} + \dfrac{1}{5}\right)$ oe <br><br> or **M1** for $\dfrac{1}{40} + \dfrac{1}{5}$ oe <br><br> OR <br><br> **B2** for 682 <br> or **M1** for $\dfrac{1}{40} \times 880$ soi by 22 <br> or $\dfrac{1}{5} \times 880$ soi by 176 |
| 4(d)(i) | 4.5[0] | **1** | |
| 4(d)(ii)(a) | 09 50 | **1** | |
| 4(d)(ii)(b) | 11.5[0] | **1** | |
| 4(d)(iii) | 6.5[0] | **3** | **B2** for 32.5 <br> or **M2** for ([0] + 8.5 + 12 + 12) – 26 <br> or **M1** for [0] + 8.5 + 12 + 12 |
| 5(a) | 4 tables and 14 chairs correctly drawn | **1** | |
| 5(b) | 14, 16, 18 | **2** | **B1** for 2 correct or $k$, $k + 2$, $k + 4$ |
| 5(c) | $2t + 6$ oe final answer | **2** | **B1** for $2t + j$ or $kt + 6$, $k \neq 0$ |
| 5(d) | 42 cao | **2** | **M1** for 18 correctly substituted into *their* **(c)**, provided a linear expression |
| 5(e) | 37 cao | **2** | **M1** for *their* **(c)** = 80 |

| Question | Answer | Marks | Partial Marks |
|----------|--------|-------|---------------|
| 6(a) | 55 | 1 | |
| 6(b) | 108 | 2 | **M1** for $\dfrac{18}{10} \times [60]$ oe |
| 6(c) | Correct graph<br>Ruled lines<br>(09 55, 31.5) to (10 30, 31.5)<br><br>(10 30, 31.5) to (10 50, 30)<br><br>(10 50, 30) to (11 10, 12)<br><br><br>(11 10, 12) to (11 20, 12)<br><br><br>(11 20, 12) to (11 35, 0) | 4 | **B1** for ruled lines<br>(09 55, 31.5) to (10 30, 31.5)<br>and (10 30, 31.5) to (10 50, 30)<br><br><br>**B1** for ruled line from (*their*10 50, 30) to (*their* 10 50+20, 12)<br><br>**B1** for ruled line from (*their* 11 10, 12) to (*their* 11 10+10, 12)<br><br>**B1** for ruled line (*their*11 20, 12) to (*their*11 20+15, 0)<br>or for 15 mins soi |
| 7(a) | 19.2 | 2 | **B1** for 9.6 cm seen |
| 7(b) | [0]45 | 1 | |
| 7(c) | Correct ruled perpendicular bisector with 2 pairs of arcs | 2 | **B1** for correct bisector drawn without arcs or for two pairs of correct arcs |
| 7(d) | *K* marked correctly twice | 4 | **B1** for line indicating correct bearing of 203° measured<br><br>**B2** for an arc radius 4.4 cm, centre *T*, the arc length being fit for purpose<br><br>or **B1** for an arc of any radius, centre *T*<br><br>or **M1** for 8.8 ÷ 2 soi by 4.4<br><br>*K* marked correctly once implies 3 marks |
| 7(e) | 138 | 2 | **M1** for $318 - 180$ or a correct diagram seen |

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 8(a) | $[y=]-\dfrac{1}{2}x+3$ | **3** | **B2** for $[y=]-\dfrac{1}{2}x+c$ <br> or <br> **M1** for $\dfrac{rise}{run}$ or $m=\pm\dfrac{1}{2}$ oe <br><br> and **B1** for $[y=]kx+3$, $k\neq0$ <br> or $c=3$ |
| 8(b)(i) | –1 | **2** | **M1** for $[a=]\dfrac{2}{3}\times9-7$ or better |
| 8(b)(ii) | 15 | **2** | **M1** for $3=\dfrac{2}{3}b-7$ or better |
| 8(c)(i) | –28, –4, 2 | **3** | **B1** for each |
| 8(c)(ii) | correct smooth curve | **4** | **B3FT** for 6 or 7 correct plots <br> or **B2FT** for 4 or 5 correct plots <br> or **B1FT** for 2 or 3 correct plots |
| 8(c)(iii) | (1.5 , 2.25) | **1** | accept $(x, y)$ where <br> $1<x<2$ and $2<y<4$ |
| 9(a)(i) | 15 | **2** | **B1** for 4 cm or 8 cm |
| 9(a)(ii) | 428 or 429 or 428.4 or 428.5 <br> or 428.49 to 428.52 | **3** | **M2** for $120\times2+60\pi$ <br> or **M1** for $60\pi$ <br><br> If 0 scored **SC1** for 28.6 or 28.56 to 28.57 |
| 9(a)(iii) | 5 minutes 6 seconds | **3** | **FT** *their* **(a)(ii)** <br><br> **M1** for $\dfrac{their\ \textbf{(a)(ii)}}{1.4}$ <br> **M1dep** for ÷ 60 |
| 9(b)(i) | 45 | **2** | **M1** for $\dfrac{60\times60}{80}$ oe |
| 9(b)(ii) | 11, 10 | **3** | **B2** for 880 or $8\times10\times11$ oe <br><br> or **B1** for $880k$, $k>1$ <br> or **M1** for 80, 160, 240.. <br> and 88, 176, 264,… <br> or $8\times10$ and $8\times11$ seen |

| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 10(a) | correct triangle drawn with arcs | **2** | **B1** for correct triangle without arcs or for correct arcs |
| 10(b) | 280 | **2** | **M1** for $\frac{1}{2}(24+16)\times14$ oe |
| 10(c) | 20 | **3** | **M2** for $\frac{360}{180-162}$ or better<br><br>or **M1** for $180-162$<br>or $(n-2)\times180=162n$ or better |
| 10(d) | 11 | **3** | **M2** for $h^2=\frac{363}{3}$ or better<br><br>or **M1** for $\frac{1}{2}\times h\times6h=363$ oe |
| 10(e) | 62.8 or 62.83 to 62.84 | **3** | **M2** for $\frac{1}{2}\pi\times7^2-\frac{1}{2}\pi\times3^2$ oe<br><br>or **M1** for $\left[\frac{1}{2}\times\right]\pi\times7^2$ or $\left[\frac{1}{2}\times\right]\pi\times3^2$ |