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

**MATHEMATICS** **0580/31**

Paper 3 (Core) **October/November 2017**

MARK SCHEME

Maximum Mark: 104

**Published**

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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)(i) | 16 | **1** | |
| 1(a)(ii) | –15 | **1** | |
| 1(b)(i) | Friday | **1** | |
| 1(b)(ii) | 6 | **1** | |
| 1(c)(i) | 1605 or 405 pm | **1** | |
| 1(c)(ii) | 4 | **1** | |
| 2(a) | 180.5[0] | **3** | **M2** for $3 \times 24 + 5 \times 12.50 + 46$ oe<br><br>or **M1** for $3 \times 24$ or $5 \times 12.50$ or better, soi by 72 or 62.5 |
| 2(b) | 69.12 | **2** | **M1** for $64 \times 1.08$ oe |
| 2(c) | 12 | **3** | **M2** for $(\frac{280}{250} - 1) \times 100$ or $\frac{280-250}{250} \times 100$ oe<br><br>or **M1** for $\frac{280}{250} - 1$ or $\frac{280}{250} \times 100$ or $\frac{280-250}{250}$ oe |
| 2(d) | 561 | **3** | **M1** for $5.5 \times 8.5$ soi by 46.75<br><br>**M1** for *their* $46.75 \times 12$ |
| 2(e) | 4287.66 | **3** | **M2** for $3600 \times (1 + \frac{6}{100})^3$ oe<br><br>or **M1** for $3600 \times (1 + \frac{6}{100})^2$ oe soi by 4044.96<br><br>If zero scored, **SC2** for 687.6576, 687.658, 687.66, 687.65, 687.7, 688 or 690 |

| Question | Answer | Marks | Partial marks |
|---|---|---|---|
| 3(a)(i) | Written test and a valid reason | **1** | |
| 3(a)(ii) | Positive | **1** | |
| 3(a)(iii) | (45,10) indicated | **1** | |
| 3(a)(iv) | 42 | **1** | |
| 3(b)(i) | 29 | **2** | **M1** for 6 in the correct order, 8 14 17 21 23 29… or … 29 30 32 39 41 48 |
| 3(b)(ii) | 27.5 or 27.45 to 27.46 | **2** | **M1** for all 11 numbers added, allowing one error or omission, and divided by 11 |
| 4(a)(i) | Correct point plotted | **1** | |
| 4(a)(ii) | Right-angled or scalene | **1** | |
| 4(a)(iii) | 8<br>4 | **1** | |
| 4(a)(iv)(a) | 0.5 oe | **2** | **M1** for attempt at rise ÷ run |
| 4(a)(iv)(b) | [$y$ =] 0.5$x$ oe | **1FT** | Correct or **FT** *their* **(iv)(a)** |
| 4(b)(i) | …1 …–5 –5…1 15 | **3** | **B2** for 3 or 4 correct<br>or **B1** for 1 or 2 correct |
| 4(b)(ii) | Correct curve | **4** | **B3FT** for 8 or 9 points correctly plotted<br>**or B2FT** for 6 or 7 points correctly plotted<br>**or B1FT** for 4 or 5 points correctly plotted |
| 4(b)(iii) | –2.8 1.8 | **2FT** | **B1FT** for each |
| 5(a) | 51.6 | **2** | **B1** for 4.3[cm] |
| 5(b) | [0]47 | **1** | |
| 5(c) | 292 | **1** | |
| 5(d)(i) | Arc centre $A$ radius 7 cm | **1** | |
| | Arc centre $C$ radius 3.5 cm | **1** | |
| | One point **marked** at intersection of correct arcs | **1** | If zero scored, **SC1** for any arc centred on $A$ or $C$, or correct point marked with no arcs |
| 5(d)(ii) | 504 | **2** | **M1** for 84 ÷ *their* time or 84 × 6 |
| 5(e) | 298 | **2** | **M1** for 118 + 180 oe |

| Question | Answer | Marks | Partial marks |
|---|---|---|---|
| 6(a)(i) | 1, 2, 3, 6, 9, 18 only | **2** | **B1** for 4 or 5 correct factors and no extras or 6 correct with one extra |
| 6(a)(ii) | Any multiple of 30 | **1** | |
| 6(a)(iii) | 46.2 | **1** | |
| 6(a)(iv) | 15.625 | **1** | |
| 6(a)(v) | 5 | **1** | |
| 6(b) | $2^3 \times 3^2$ | **2** | **M1** for a complete factor tree<br>or 2, 2, 2, 3, 3 clearly identified as factors |
| 6(c) | 240 | **2** | **M1** for [16=] $2^4$ or $2 \times 2 \times 2 \times 2(\times 1)$<br>or [30=] $2 \times 3 \times 5(\times 1)$<br>or lists of multiples of both at least up to 240,<br>or any product that equals 240<br><br>or **B1** for 240*n* |
| 6(d) | 20 00 or 8 pm | **3** | **M1** for [LCM of 6 and 9 =] 18(00) or **M1** for lists of multiples<br>**B1FT** for "2 am" + *their* 18 correctly worked out soi OR<br>**B2** for [clock A = 2] 8, 14, 20… and [clock B = 2] 11, 20….<br>or **B1** for [clock A = 2] 8, 14, 20…or [clock B = 2] 11, 20… |
| 7(a)(i) | $\frac{6}{20}$ oe | **1** | |
| 7(a)(ii) | $\frac{5}{20}$ oe | **1** | |
| 7(a)(iii) | 0 | **1** | |
| 7(b) | [0].28 oe | **2** | **M1** for 1 – 0.3 – 0.24 – 0.18 oe or 1 – 0.72 oe |
| 7(c) | $\frac{8}{20}$ | **1** | Accept 8 ÷ 20 |
| | $\frac{6}{15}$ | **1** | Accept 6 ÷ 15 |
| | Comparing the two fractions with equal denominators or as decimals | **1** | e.g. $\frac{8}{20} = \frac{24}{60}$ and $\frac{6}{15} = \frac{24}{60}$<br>or both shown equal to $\frac{2}{5}$ or [0] .4 or 40% |

| Question | Answer | Marks | Partial marks |
|---|---|---|---|
| 8(a) | $8x + 7$ final answer | **2** | **B1** for $10x + 15$ or $-2x - 8$<br>or $8x + j$ or $kx + 7$ as final answer |
| 8(b)(i) | $6x$ final answer | **1** | |
| 8(b)(ii) | $5a$ final answer | **1** | |
| 8(c) | $10y + 12$ or $2(5y + 6)$ final answer | **3** | **M1** for $2(3y + 1) + 2(2y + 5)$ oe<br>**B1** for $10y + j$ or $ky + 12$ ($k \neq 0$) |
| 8(d) | $7(m + 6) + 3m = 182$ or $7m + 42 + 3m = 182$ | **2** | **B1** for $m + 6$<br>or $7t + 3m = 182$ |
| | 14 | **3** | **M1** for $7m + 42$ [$+ 3m = 182$]<br>**M1** for $7m + 3m = 182 - 42$ or better<br>OR<br>**M2** for [$m$=] $(182 - (6 \times 7)) / (7 + 3)$ or better<br>or **M1** for $182 - (6 \times 7)$ or better |
| 9(a)(i) | 7.5 | **2** | **M1** for $\frac{1}{2} \times 5 \times 3$ or evidence of counting squares |
| 9(a)(ii) | Correct enlargement | **2** | **B1** for one line correctly scaled |
| 9(b)(i) | Rotation<br>[centre] (0,0) oe<br>180° | **3** | **B1** for each |
| 9(b)(ii) | Correct reflection with points (–3,–3), (–1,–5) and (–6,–6) | **2** | **B1** for reflection in $y = k$ or $x = -1$ |
| 9(b)(iii) | Correct translation with points (4,4), (2,2) and (–1,5) | **2** | **B1** for a correct horizontal translation (5 to the right) or a correct vertical translation (1 up) |
| 10(a)(i) | 30 | **1** | |
| 10(a)(ii) | add 8 oe | **1** | |
| 10(a)(iii) | $8n - 10$ oe final answer | **2** | **B1** for $8n + j$ or $kn - 10$ ($k \neq 0$) |
| 10(b) | 9 | **1** | |
| 10(c) | 34 | **1** | |