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**MATHEMATICS**

**0580/11**

Paper 1 (Core)

**May/June 2017**

MARK SCHEME

Maximum Mark:56

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**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.

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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 | Part marks   |
|----------|---|-------|--|
| 1        | 70 020 cao                                | 1     |  |
| 2        | [0].008                                   | 1     |  |
| 3        | 2   | 1     |  |
| 4        | $x^{10}$                                  | 1     |  |
| 5        | Congruent                                 | 1     |  |
| 6        | 31 or 37                                  | 1     |  |
| 7(a)     | 23.46 cao                                 | 1     |  |
| 7(b)     | 20 cao                                    | 1     |  |
| 8        | $4n(3n - m)$ final answer                 | 2     | <b>B1</b> for $4(3n^2 - mn)$ or $n(12n - 4m)$ or $2n(6n - 2m)$ or $2(6n^2 - 2mn)$  |
| 9        | 6   | 2     | <b>B1</b> for answer 2 or 3 or $2 \times 3$ or <b>M1</b> for prime factors of 126 <b>and</b> 150 seen  |
| 10(a)    | Chicago                                   | 1     |  |
| 10(b)    | -3  | 1     |  |
| 11       | $21y + xy$ or $y(21 + x)$<br>final answer | 2     | <b>B1</b> for $14x + 21y$ or $-14x + xy$ or answer of $ky + xy$  |
| 12       | 3567.5                                    | 1     |  |
|          | 3572.5                                    | 1     | <b>SC1</b> for both correct but reversed   |
| 13       | $\begin{pmatrix} -1 \\ -9 \end{pmatrix}$  | 2     | <b>B1</b> for $\begin{pmatrix} -6 \\ -8 \end{pmatrix}$ seen or answer $\begin{pmatrix} k \\ -9 \end{pmatrix}$ or $\begin{pmatrix} -1 \\ k \end{pmatrix}$ |
| 14       | 14.88                                     | 2     | <b>M1</b> for $5000 \div 336$ or <b>B1</b> for 14.881 or 14.880[9...] or 14.9  |

| Question  | Answer  | Marks | Part marks   |
|-----------|---|-------|--|
| 15(a)     | $\frac{21}{50}$ oe  | 1     |  |
| 15(b)     | 315   | 1FT   | FT <i>their (a)</i> $\times 750$ provided<br>$0 < \textit{their (a)} < 1$  |
| 16        | $\frac{2}{9}$   | 2     | B1 for $\frac{8}{36}$ or $\frac{4}{18}$  |
| 17        | $\sqrt{\frac{A}{4\pi}}$ or $\frac{1}{2}\sqrt{\frac{A}{\pi}}$ oe | 2     | M1 for $r^2 = \frac{A}{4\pi}$ or $2r\sqrt{\pi} = \sqrt{A}$<br>or $4r^2 = \frac{A}{\pi}$ or $\pi r^2 = \frac{A}{4}$     |
| 18(a)     | -5  | 1     |  |
| 18(b)(i)  | $3 \times (5 + 2) + 2 = 23$                                     | 1     |  |
| 18(b)(ii) | $12 \div (4 + 2) = 2$   | 1     |  |
| 19        | $\frac{14(\text{or } 35)}{21} + \frac{15}{21}$                  | M1    | accept $\frac{14k(\text{or } 35k)}{21k} + \frac{15k}{21k}$   |
|           | $2\frac{8}{21}$ cao   | A2    | or A1 for $\frac{50}{21}$ or $1\frac{8}{21}$ or $\frac{29}{21}$ or $1\frac{29}{21}$                                    |
| 20        | Correctly eliminating one variable                              | M1    |  |
|           | [x =] 2   | A1    |  |
|           | [y =] -7  | A1    | If zero scored,<br>SC1 for 2 values satisfying one of the<br>original equations<br>SC1 for both correct but no working |
| 21        | Complete correct ruled net                                      | 3     | B2 for 4 correct rectangles in correct<br>places<br>or B1 for 2 correct side rectangles in<br>correct places           |
| 22(a)     | Points plotted at<br>(4.5, 33) and (6.5, 35)                    | 1     |  |
| 22(b)     | Positive  | 1     |  |
| 22(c)     | Correct ruled line  | 1     |  |
| 22(d)     | 33.5 to 37.5  | 1FT   | FT from <i>their</i> line provided positive<br>gradient  |

| Question  | Answer  | Marks | Part marks  |
|-----------|---|-------|---|
| 23(a)(i)  | Correct ruled bisector of $AB$ with 2 pairs of arcs | 2     | <b>B1</b> for correct bisector with no or incorrect arcs or 2 pairs of correct arcs |
| 23(a)(ii) | Complete circle,<br>radius 3 cm, centre $C$         | 2     | <b>B1</b> for an arc of correct radius or a circle of incorrect radius              |
| 23(b)     | Correct region shaded                               | 1     | dep on at least <b>B1</b> in both parts   |
| 24(a)(i)  | 338 or 338.3 nfw<br>or 338.2 to 338.26              | 3     | <b>M1</b> for $3 \times 74$<br>and <b>M1</b> for $74 \times \pi \div 2$             |
| 24(a)(ii) | 7630 nfw<br>or 7626 to 7627                         | 3     | <b>M1</b> for $74^2$<br>and <b>M1</b> for $\frac{\pi \times 37^2}{2}$               |
| 24(b)     | 38100 nfw<br>or 38200 or 38150<br>or 38130 to 38140 | 1FT   | <b>FT</b> their <b>(a)(ii)</b> $\times 5$   |