



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS

0580/32

Paper 3 (Core)

October/November 2016

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 | Mark | Part marks | |
|----------|---------|---|----------------|--|
| 1 | (a) (i) | 12 | 1 | |
| | (ii) |  | 1 | |
| | (iii) | Fantasy | 1 | |
| | (iv) | $\frac{4}{50}$ oe isw | 1 | |
| | (b) (i) | 3 | 2 | M1 for 25th and 26th value or list of at least first or last 26 values |
| | (ii) | 3.1 nfww | 3 | M1 for $7 \times 1 + 2 \times 14 + 3 \times 12 + 4 \times 5 + 5 \times 8 + 6 \times 4$ or better M1 dep for <i>their</i> $155 \div 50$ |
| | (c) (i) | $\frac{90}{360}$ oe | 1 | |
| | (ii) | 125 | 3 | B1 150 soi M1 for $\frac{their150}{360} \times 300$ oe |
| 2 | (a) (i) | Octagon | 1 | |
| | (ii) | 2 | 1 | |
| | (iii) | Correct enlargement | 2 | B1 for enlargement with incorrect scale factor (sf $\neq 1$) or B1 for any four sides correct |
| | (b) (i) | Rotation 90° clockwise oe [Centre] (0, 0) oe | B1 B1 B1 | |
| | (ii) | Correct reflection Vertices (-2, -1), (-2, -2), (-5, -2) | 1 | |

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| Question | Answer | Mark | Part marks |
|----------|---|------------|---|
| (iii) | Correct translation Vertices (4, -2), (5, -2), (5, 1) | 2 | B1 for translation $\begin{pmatrix} 3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -4 \end{pmatrix}$ |
| 3 (a) | 2 <i>B</i> and 1 <i>A</i> selected, with at least one other combination and its value seen or 2 <i>B</i> and 1 <i>A</i> selected, with 0.625 and 0.64 seen 3.15 selected | 2 1 | M1 for one correct cost for 5 litres or B1 for 0.625 or 0.64 Independent |
| (b) | 2 | 2 | M1 for $[1.5 +] \frac{1}{3} \times 1.5$ oe soi by 0.5 |
| (c) (i) | 5 : 2 : 10 | 2 | M1 for 500 : 200 : 1000 oe |
| (ii) | 6.8 | 3 | B2 for answer 6800 or M2 for $\frac{2}{5} \times 17$ oe or for $4 \times (0.5 + 0.2 + 1)$ or for $4 \times (500 + 200 + 1000)$ oe or M1 for $\frac{5}{17}$ soi or for $\frac{2000}{500}$ oe soi by 4 |
| (d) | 7.79 or 7.80 or 7.794 to 7.795 | 2 | M1 for $300 = \pi \times 3.5^2 \times h$ or better implied by $\frac{300}{(38.4 \text{ to } 38.5)}$ |
| (e) | 755 745 | 2 | B1 for one correct or both values reversed |
| 4 (a) | 9, -3, -3 | 2 | B1 for 9 or -3 and -3 |
| (b) | Correct curve | 4 | B3FT for 6 or 7 correctly plotted points or B2FT for 4 or 5 correctly plotted points or B1FT for 2 or 3 correctly plotted points |
| (c) | $x = 2.5$ | 1 | |
| (d) (i) | (4, 0) | 1 | |
| (ii) | (0, 4) | 1 | |

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| Question | Answer | Mark | Part marks |
|-----------|--|------|--|
| (e) | Ruled line through (4, 0) and (0, 4) | 1 | |
| (f) | (4.1 to 4.3, -0.1 to -0.5) (-0.1 to -0.3, 4.1 to 4.5) | 2FT | B1FT for one correct or both x -values correct or both y -values correct |
| 5 (a) (i) | 40 to 42 | 2 | M1 for 8.0 to 8.4 or 80 to 84 seen |
| (ii) | 104 to 108 | 1 | |
| (iii) | D marked correctly | 2 | B1 for bearing 215° B1 for distance 6 cm |
| (iv) | P marked correctly with arcs | 3 | B1 for arc centre C radius 5 cm B1 for two correct pairs of intersecting arcs (for perpendicular bisector of AB) B1 P marked in correct position |
| (b) (i) | 05 45 [0]6 15 [0]7 30 [0]6 20 06 50 08 05 | 3 | B1 for each |
| (ii) | 42.9 or 42.85 to 42.86 | 2 | M1 for $\frac{25}{35}$ or $\frac{25}{0.583\dots}$ or $\frac{25}{35} \times 60$ oe |
| 6 (a) | 4 or 1 | 2 | B1 for 2 or 3 or 6 or 8 or 12 or 24 or 2^2 or 1^2 |
| (b) | 125 | 1 | |
| (c) (i) | 3.5 or $3\frac{1}{2}$ | 1 | |
| (ii) | 4913 | 1 | |
| (iii) | 0.0625 or $\frac{1}{16}$ | 1 | |
| (d) | 6.174 | 2 | M1 for $\frac{1}{2} \times 0.7 \times 4.2^2$ soi by 6.17 |
| (e) (i) | 1 | 1 | |
| (ii) | b^5 | 1 | |
| (iii) | c^{-4} or $\frac{1}{c^4}$ | 1 | |

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| Question | Answer | Mark | Part marks |
|----------|---------|---|--|
| 7 | (a) (i) | 122 | 1 |
| | (ii) | 625.86 cao | 3 |
| | (b) | Mei 9.61 cao | 3 |
| (c) | 554.36 | 3 | <p>M2 for $15.25 \times 1.08 \times 38$ oe soi by 626 or 625.9 or M1 for 15.25×1.08 soi by 16.47 or for 15.25×38 soi by 579.5</p> <p>If zero scored, SC1 for 131.76 or 5006.88</p> <p>M1 for 425×1.45</p> <p>M1FT for $\pm(\text{their } 625.86 - \text{their } 616.25)$</p> <p>If zero scored, SC1 for [€] 6.62 to 6.63</p> <p>M2 for 500×1.035^3 oe or M1 for 500×1.035^k, $k \neq 1, 3$</p> <p>If zero scored, SC1 for answer of 54.36 or 54.35 or 54.4 or 54.358... 54.359</p> |
| 8 | (a) (i) | Tangent | 1 |
| | (ii) | Chord | 1 |
| | (b) (i) | Angle [in] semicircle | 1 |
| | (ii) | 20 | 2 |
| | (iii) | $[AB =] \sqrt{8^2 + 5^2} = 9.433\dots$ or 9.434 | M2 |
| | (iv) | 69.8 or 69.9 or 69.84 to 69.91 | 2 |
| | (v) | 71.3 to 71.4 | 2 |

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| Question | Answer | Mark | Part marks |
|----------|---|------|--|
| 9 (a) | | 1 | |
| (b) | $\begin{array}{ccc} 4 & 5 & 11 \\ 10 & 13 & 31 \end{array}$ | 4 | B1 for 11 B1 for 31 B2 for 4, 5, 10, 13 or B1 for two of 4, 5, 10, 13 |
| (c) (i) | $n + 1$ oe final answer | 1 | |
| (ii) | $3n + 1$ oe final answer | 2 | B1 for $3n + k$ or $cn + 1$ $c \neq 0$ |
| (d) | 26 | 2 | M1FT for <i>their</i> c(ii) = 76 or better or M1 implied by answer of 25 |