

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0580 MATHEMATICS

0580/31

Paper 3 (Core), maximum raw mark 104

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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) | <table border="1"> <tr> <td>26</td> <td>39</td> <td>65</td> </tr> <tr> <td>44</td> <td>11</td> <td>55</td> </tr> <tr> <td>70</td> <td>50</td> <td>120</td> </tr> </table> | 26 | 39 | 65 | 44 | 11 | 55 | 70 | 50 | 120 | 2 | B1 for 3 or 4 correct |
| | 26 | 39 | 65 | | | | | | | | | |
| | 44 | 11 | 55 | | | | | | | | | |
| | 70 | 50 | 120 | | | | | | | | | |
| | (ii) $\frac{11}{30}$ cao | 2 | B1 for $\frac{44}{120}$ or $\frac{22}{60}$ | | | | | | | | | |
| | (iii) 2 : 3 cao | 2 | B1FT for $2k : 3k$ where k is an integer or <i>their</i> 26 : <i>their</i> 39 or better with integer values | | | | | | | | | |
| (b) (i) 7.53 | 2 | M1 for attempt at ordered list, or 7.34 and 7.72 identified | | | | | | | | | | |
| (ii) 3.65 | 1 | | | | | | | | | | | |
| (iii) 10.06 6.01 | 2 | B1 for 1 correct | | | | | | | | | | |
| 2 (a) (i) | 24 or 30 | 1 | | | | | | | | | | |
| | (ii) 25 | 1 | | | | | | | | | | |
| | (iii) 27 | 1 | | | | | | | | | | |
| | (iv) 23 or 29 | 1 | | | | | | | | | | |
| | (b) (i) 17 | 1 | | | | | | | | | | |
| | (ii) 243 | 1 | | | | | | | | | | |
| | (iii) 1 | 1 | | | | | | | | | | |

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| Question | Answer | Mark | Part marks |
|------------------|---|-------------|---|
| (iv) | 0.0625 or $\frac{1}{16}$ | 1 | |
| (c) (i) | $2^2 \times 3 \times 7$ or $2 \times 2 \times 3 \times 7$ | 2 | B1 for 2, 2, 3, 7 |
| (ii) | 42 | 2 | B1 for $2 \times 3 \times 7$ or 2 or 3 or 6 or 7 or 14 or 21 as answer or [126 =] $2 \times 3^2 \times 7$ or $2 \times 3 \times 3 \times 7$ |
| 3 (a) (i) | 565.25 | 2 | M1 for $\left(1 - \frac{5}{100}\right) \times 595$ oe |
| (ii) | 42.75 | 2FT | 2FT if positive difference (ie (a)(i) < 608) M1 for 38×16 (or 608) – <i>their</i> (a)(i) |
| (b) | 9.2[0...] | 2 | M1 for $\left(\frac{26272 - 23854}{26272}\right) \times 100$ oe or $\left(1 - \frac{23854}{26272}\right) \times 100$ oe or $100 - \frac{23854}{26272} \times 100$ oe |
| (c) | 5.07×10^5 cao | 2 | B1 for figs 507 or for $a \times 10^5$ ($a \neq 0$) |
| (d) (i) | 120° 80° | 3 | B2 for one correct or M1 for $\frac{15}{45} \times 360$ or $\frac{10}{45} \times 360$ or $\frac{160}{20} \times 15$ or $\frac{160}{20} \times 10$ or better |
| (ii) | Pie chart correct | 1FT | FT if <i>their</i> angles add to 200° |
| (e) | 3.84×10^6 | 2 | B1 for answer figs 384 |

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| Question | Answer | Mark | Part marks |
|----------|------------------------------------|------|---|
| 4 | (a) (i) $m + 5$ | 1 | |
| | (ii) $2m$ | 1 | |
| | (iii) $m + m + 5 + 2m = 47$ isw | 1FT | FT $m + their (a)(i) + their (a)(ii) = 47$ isw or $4m + 5 = 47$ isw |
| | (iv) 10.5 15.5 21 | 3 | M1FT for correct first step to solve <i>their (a)(iii)</i> A1FT for $m = 10.5$ |
| | (b) (i) Yes, [total =] 114.5 [cm] | 2 | M1 for $55 + 39.5 + 20$ oe or for 1145 mm |
| | (ii) 5.5 | 1 | |
| | (c) (i) 102 | 1 | |
| | (ii) 37.5[0] | 2 | M1 for $25.5[0] \div 0.68$ |

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| Question | Answer | Mark | Part marks |
|-----------|--|--|---|
| 5 | (a) (i) 4.8 | 2 | B1 for 9.6 seen |
| | (ii) 137 | 1 | |
| | (b) Correct length and bearing | 2 | B1 for $AC = 6.4$ cm B1 for correct bearing 310° |
| | (c) Perpendicular bisector with 2 sets of correct arcs | 2 | B1 for correct line with some or no or incorrect arcs or B1 for 2 sets of correct arcs |
| | (d) Correct area shaded | 3 | B2 for arc centre B radius 6 cm touching <i>their</i> bisector twice or B1 for arc centre B , with radius 6 cm but incorrect length or for arc centre B , with incorrect radius |
| (e) 11 03 | 3 | M2 for $12 \div 15 \times 60$ or M1 for $12 \div 15$ soi If zero scored, SC1 for <i>their</i> time added to 10 15 correctly | |
| 6 | (a) Cylinder | 1 | |
| | (b) Cube or cuboid | 1 | |
| | (c) (i) $\sqrt{6^2 - 3^2}$ 5.19... | M2 A1 | M1 for $6^2 = 3^2 + BC^2$ or $(BC^2 =) 6^2 - 3^2$ |
| | (ii) 7.79 to 7.8 | 2 | M1 for $0.5 \times 5.2 \times 3$ |
| | (iii) 62.4 | 1FT | FT $8 \times$ <i>their</i> (c)(ii) |
| | (d) (i) 28 | 2 | M1 for $0.5 \times (6 + 8) \times 4$ oe |
| (ii) 12 | 1FT | FT $336 \div$ <i>their</i> (d)(i) | |

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| Question | Answer | Mark | Part marks |
|-----------------|---------------------------------|-------------|---|
| 7 | (a) (i) -2, -3, -6, 3 | 2 | B1 for 2 or 3 correct |
| | (ii) Correct curves | 4 | B3FT for 9 or 10 correctly plotted points or B2FT for 7 or 8 correctly plotted points or B1FT for 5 or 6 correctly plotted points |
| | (iii) Ruled line $y = 4$ | 1 | |
| | (iv) (1.4 to 1.6, 4) | 1 | SC1 for (4, 1.4 to 1.6) from line $x = 4$ drawn |
| | (b) (i) (-1, -3) plotted | 1 | |
| | (ii) Correct ruled line | 1FT | FT line with gradient 2 through <i>their A</i> |
| | (iii) $2x - 1$ | 2FT | FT $2x + \textit{their y-intercept}$ for 2 marks B1 for $2x + k$ or $mx - 1$ ($m \neq 0$) or $mx + \textit{their y-intercept}$ ($m \neq 0$) |

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| Question | Answer | Mark | Part marks |
|----------|--|-------------------------------------|--|
| 8 | (a) (i) 2 | 1 | |
| | (ii) Two correct lines of symmetry drawn | 2 | B1 for one correct line |
| | (b) (i) Correct reflection | 2 | B1 for reflection in $x = k$ or $y = -1$ |
| | (ii) Correct enlargement | 2 | B1 for correct shape, incorrect position or enlargement correct centre, incorrect scale factor |
| | (iii) Rotation 90° clockwise oe [Centre] (0, 0) oe | B1 B1 B1 | |
| 9 | (a) $2x$ final answer | 2 | M1 for $6x + 4$ or $-4x - 4$ |
| | (b) $3y(y - 2)$ final answer | 2 | B1 for $3(y^2 - 2y)$ or $y(3y - 6)$ |
| | (c) $4a + 20$ or $4(a + 5)$ | 2 | M1 for $a + 5 = \frac{b}{4}$ or $4a = b - 20$ |
| | (d) Correct working and [$x =$] 5, [$y =$] -2 | 3 | M1 for correctly eliminating one variable A1 for $x = 5$ A1 for $y = -2$ If zero scored, SC1 for 2 values satisfying one of the original equations SC1 if no working shown, but 2 correct answers given |