

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series**0580 MATHEMATICS****0580/42**

Paper 4 (Extended), maximum raw mark 130

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

| | | | |
|---------------|--|-----------------|--------------|
| Page 2 | Mark Scheme | Syllabus | Paper |
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

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) | $\frac{512}{7+11+14} \times 14$ | M2 | or M1 for $\frac{512}{7+11+14}$ |
| (ii) | 112 | 1 | |
| (b) | 10 100 | 2 | M1 for 224×45 soi by 10080 |
| (c) | 19 | 2 | M1 for $224 \div 12$ soi by 18.66 to 18.67 or 18.7 or $18\frac{2}{3}$ |
| (d) (i) | 4093000 | 1 | |
| (ii) | 4.093×10^6 | 1FT | FT <i>their</i> (d)(i) |
| (e) | 198 or 198.1 to 198.2 | 3 | M2 for $\frac{8.2-2.75}{2.75} \times 100$ oe or M1 for $\frac{8.2}{2.75} \times 100$ or $\frac{8.2-2.75}{2.75}$ |
| 2 (a) | 0 4 0.625 0.875 | 1,1,1,1 | |
| (b) | Fully correct smooth curve | 4 | B3 FT for 8 or 9 points or B2 FT for 6 or 7 points or B1 FT for 4 or 5 points |
| (c) | line $y = x + 1$ ruled and 0.2 to 0.3 and 1.8 to 1.95 | 3 | Line must be fit for purpose ie at least from $x = 0$ to $x = 2$ B2 for correct line and 1 correct value or B1 for correct line or SC1 for no/wrong line and 2 correct values |

| Page 3 | Mark Scheme | Syllabus | Paper |
|--------|---|----------|-------|
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

| | | | |
|---------|--|--------------------|---|
| (d) | Tangent ruled at $x = -1.5$ 2.2 to 5 | B1 2 | No daylight between tangent and curve at point of contact. Consider point of contact as midpoint between two vertices of daylight, the midpoint must be between $x = -1.6$ and $x = -1.4$ dep on B1 M1 for $\frac{\text{rise}}{\text{run}}$ also dep on any tangent drawn or close attempt at tangent at any point Must see correct or implied calculation from a drawn tangent |
| 3 (a) | Correct diagram | 3 | B1 for correct vertical plots and B1 for correct horizontal plots and B1 dep on at least B1 for reasonable <u>increasing</u> curve or polygon through <i>their</i> 6 points If zero scored, SC1 for 5 out of 6 correct plots |
| (b) (i) | 32 to 34 | 1 | |
| (ii) | 120 – reading at $r = 50$ | 2FT | B1FT for reading at $r = 50$ seen |
| (c) | 8 18 27 | 2 | B1 for 2 correct |
| (d) | 35.2 or $35\frac{1}{6}$ or 35.16 to 35.17 nfw | 4 | M1 for mid-values soi M1 FT for $\sum fx$ with x in the correct interval including boundaries M1dep for $\sum fx \div 120$ dependent on second M1 earned |
| (e) | 1.6 1.35 0.3 | 4FT | FT from (c) <i>their</i> $8 \div 5$ and <i>their</i> $27 \div 20$ B3FT for any 2 correct or B2FT for first or second answer correct or B1 for 0.3 only |
| 4 (a) | 1.6[0] or 1.601 to 1.602 | 3 | M2 for $\frac{0.6}{\cos 68}$ oe or M1 for $\cos 68 = \frac{0.6}{AC}$ |
| (b) | 43.5 or 43.6 or 43.49 to 43.56 | 4 | M2 for $\frac{1.9^2 + 2.3^2 - \text{their} 1.6^2}{2 \times 1.9 \times 2.3}$ or M1 for implicit statement A1 for [cos =] 0.724 to 0.726 |

| Page 4 | Mark Scheme | Syllabus | Paper |
|--------|---|----------|-------|
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

| | | | |
|-----------|---|--|--|
| (c) | 1.33 or 1.332...nfww | 4 | <p>M2 for $\sqrt{2.3^2 - \left(\frac{1}{2} \times 1.2\right)^2}$ or M1 for $2.3^2 = h^2 + (0.5 \times 1.2)^2$</p> <p>and M1 for $\frac{1}{2} \times 1.2 \times \text{their } 2.22$ (<i>their 2.22</i> must come from attempt at Pythag or from trig in triangle <i>BCD</i>)</p> |
| (d) | 41.1 or 41.13 to 41.14 | 3 | <p>M2 for $\sin = \frac{1.25}{1.9}$ oe or M1 for correct angle identified</p> |
| 5 (a) (i) | $4x(3x+13) - 2x(4x - \{3x-9\}) = 24$ oe $12x^2 + 52x - 2x^2 - 18x$ $5x^2 + 17x - 12 = 0$ | <p>M1</p> <p>M1</p> <p>A1</p> | <p>Correct removal of all <i>their</i> brackets Dep on two areas added or subtracted</p> <p>with no errors or omissions seen and at least one more line of working showing collection of like terms or division by 2</p> <p>M1 for $(5x+a)(x+b)$ where $ab = -12$ or $5b+a = 17$ [a, b integers]</p> <p>A1 If zero scored SC1 for correct answers with no working or from other methods.</p> <p>M1</p> <p>A1 SC1 if no working shown, but 2 correct answers given A1 If zero scored SC1 for 2 values satisfying one of the original equations</p> <p>5 M1 for $2(t+3)(t+3) - t^2$ or better seen M1 for denominator[s] $t(t+3)$ isw or for $t(t+3)$ isw on RHS M1dep for $2t^2 + 12t + 18 - t^2 = t^2 + 3t$ oe dependent on both numerators and denominator expanding to give quadratics A1 for $9t + 18 = 0$ oe</p> |
| (ii) | $(5x-3)(x+4) [= 0]$ $\frac{3}{5}$ oe, -4 | <p>M2</p> <p>A1</p> | |
| (b) | <p>For correctly eliminating one variable</p> <p>$x = 3$ $y = -7$</p> | <p>M1</p> <p>A1</p> <p>A1</p> | |
| (c) | $t = -2$ nfww | 5 | |
| | | | |

| Page 5 | Mark Scheme | Syllabus | Paper |
|--------|---|----------|-------|
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

| | | | | | |
|-----|-------|---|---|--------------------------|---|
| 6 | (a) | (i) | 43 | 1 | |
| | | (ii) | 62 | 1 | |
| | | | Isosceles triangle or OYZ is isosceles | 1 | |
| | | | Angle at centre is twice angle at circumference | 1 | |
| | (iii) | 30 | 2 | M1 for $p + 5p = 180$ oe | |
| | | [Opposite angles of a]cyclic quadrilateral [add up to 180°] | 1 | | |
| | (b) | (i) | 1 : 2 oe | 1 | |
| | | (ii) | OQ | 1 | |
| | | | $MQ = NQ$ | 1 | |
| | | | $OM = ON$ | 1 | |
| | | Centre or O | 1 | Not origin | |
| 7 | (a) | (i) | Rotation | 1 | |
| | | | [+] 90 or 90 anticlockwise oe | 1 | |
| | | (0, 2) | 1 | Not as column vector | |
| | (ii) | Reflection | 1 | | |
| | | $y = 1$ oe | 1 | | |
| | (iii) | Enlargement | 1 | | |
| | | [s f] $-\frac{1}{2}$ oe | 1 | | |
| | | Origin oe | 1 | | |
| | (b) | | $\begin{pmatrix} -\frac{1}{2} & 0 \\ 0 & -\frac{1}{2} \end{pmatrix}$ oe | 2FT | FT their s f from (a)(iii) SC1 for $\begin{pmatrix} k & 0 \\ 0 & k \end{pmatrix}$, $k \neq 1$ or 0 |
| | (c) | | Image at (4, 1) (6, 1) (6, 5) (4, 3) | 2 | ruled or good freehand SC1 for translation $\begin{pmatrix} 2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -3 \end{pmatrix}$ or for 4 correct vertices not joined |
| (d) | | Reflection $y = x$ oe | 1 1 | | |

| Page 6 | Mark Scheme | Syllabus | Paper |
|--------|---|----------|-------|
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

| | | | | |
|----|---------|---------------------------------|------|---|
| 8 | (a) | (4, 6) | 1, 1 | |
| | (b) | 4.47 or 4.472 | 3 | M2 for $\sqrt{(8-4)^2 + (5-3)^2}$ or better or M1 for $(8-4)^2 + (5-3)^2$ or better |
| | (c) | $y = 2x - 2$ oe | 3 | B2 for $2x - 2$ or $y = 2x + c$ oe or M1 for $[m =] \frac{8-4}{5-3}$ oe soi by $2x$ and M1 for (3, 4) or (5, 8) or <i>their</i> midpoint substituted into <i>their</i> $y = mx + c$ with <i>m</i> numerical |
| | (d) | -3 | 3 | M1 for use of gradient \times <i>their</i> $m = -1$ soi by $-\frac{1}{2}$ M1 for $r = \textit{their}$ gradient $\times 6$ [+0] |
| 9 | (a) (i) | 11 | 1 | |
| | (ii) | 256 | 2 | M1 for $[g(3) =] 8$ or 2^3 or 2^{2^x} |
| | (b) | $\frac{x-5}{2}$ oe final answer | 2 | M1 for $x = 2y + 5$ or $2x = y - 5$ or better or $\frac{y}{2} = x + \frac{5}{2}$ |
| | (c) | $19 - 6x$ final answer | 2 | M1 for $2(7 - 3x) + 5$ |
| | (d) | -1, 0, 1, 2 | 3 | Additional values count as errors B2 for one error /omission or B1 for two errors/omissions or M2 for $-2 < x \leq 2$ oe seen or M1 for $-2 < x$ or $x \leq 2$ or $x = -2$ and $x = 2$ or $-4 < 2x \leq 4$ |
| 10 | (a) | 8 25 17 | 2 | B1 for 2 correct |
| | (b) | $n + 2$ oe | 1 | |
| | (c) (i) | $(n - 1)^2$ oe | 2 | M1 for $(n + k)^2$ for integer k |
| | (ii) | 92 | 2 | M1 for $\sqrt{8281}$ or 91 seen |
| | (d) (i) | $n^2 - 3n - 1$ final answer | 2 | M1 for <i>their</i> $(n - 1)^2 - \textit{their}$ $(n + 2)$ soi |
| | (ii) | 39 | 1 | |

| | | | |
|---------------|--|-----------------|--------------|
| Page 7 | Mark Scheme | Syllabus | Paper |
| | Cambridge IGCSE – October/November 2015 | 0580 | 42 |

| | | | |
|------------|-------------------------|----------|--|
| (e) | 1 and $-\frac{1}{2}$ oe | 1 | |
| | $\frac{1}{4}$ oe | 1 | |
| | $-\frac{1}{8}$ oe | 1 | |