

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the May/June 2015 series**

### **0580 MATHEMATICS**

**0580/21**

Paper 2 (Extended), maximum raw mark 70

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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         | 9.5   | 1   |   |
| 2         | 7.37 or 7.371...  | 1   |   |
| 3         | $2.7 \times 10^5$   | 1   |   |
| 4         | $2x^2 + 8x - 35$ final answer   | 2   | <b>B1</b> for 2 correct terms in final answer<br>or <b>M1</b> for $2x^2 + 3x$ or $5x - 35$  |
| 5         | Sammy<br>and<br>correct reason with 25.7% oe shown  | 2   | <b>B1</b> for 25.7% or 0.257... seen<br>or conversion of 26% to fraction and common denominator   |
| 6         | 44  | 2   | <b>B1</b> for 75.5 or 119.5 seen  |
| 7         | $24u^2w^3$ final answer   | 2   | <b>B1</b> for 2 correct elements in final answer  |
| 8         | 13.6 or 13.60...  | 3   | <b>M2</b> for $\sqrt{(-4-7)^2 + (6-(-2))^2}$ oe<br>or <b>M1</b> for $(-4-7)$ oe or $(6-(-2))$ oe  |
| 9         | $\frac{9}{5}$<br><br><i>their</i> $\frac{9}{5} \times \frac{7}{3}$ or $\frac{9 \times 7}{5 \times 3}$<br><br>$\frac{21}{5}$ or $4\frac{1}{5}$ cao | <b>B1</b><br><br><b>M1</b><br><br><b>A1</b> | or $\frac{63}{35}$<br><br>or <i>their</i> $\frac{63}{35} \div \frac{15}{35}$ or equivalent division with fractions with common denominators                                 |
| 10        | 2520  | 3   | <b>M2</b> for $12 \times (1 + 6) \div 2$ oe<br><br>or <b>M1</b> for 1 area correct<br><br>If zero scored <b>B1</b> for top speed = 720 m per min<br>or total time = 360 sec |

|        |                                 |          |       |
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| Question. | Answer  | Mark        | Part Marks  |
|-----------|---|-------------|---|
| 11 (a)    | $4n$ oe final answer  | 1           |   |
| (b)       | $3n^2 + 8$ oe final answer  | 2           | M1 for a quadratic expression as final answer or $3n^2 + 8$ oe in working   |
| 12        | 18  | 3           | M2 for $2(2 + 4)^2 = p(-2 + 4)^2$ oe<br>M1 for $p = \frac{k}{(q + 4)^2}$<br>A1 for $k = 72$   |
| 13        | 72  | 3           | M2 for $\frac{1280}{64} \times \frac{60 \times 60}{1000}$<br>M1 for working out distance $\div$ speed<br>e.g. figs $1280 \div 64$ or figs $\frac{1280}{\text{their speed}}$<br>or for working out km/h to m/s conversion<br>e.g. $64 \times \frac{1000}{60 \times 60}$ oe<br>or <i>their</i> $\left(\frac{1280}{64}\right) \times \frac{60 \times 60}{1000}$ oe |
| 14 (a)    | $a + 2b - a$ or $a - (a - 2b)$ oe   | 1           |   |
| (b)       | Parallelogram<br><i>PM</i> equal and parallel to <i>QR</i><br>or<br><i>PM</i> or <i>PS</i> parallel to <i>QR</i><br>and <i>MR</i> found = <b>a</b> so 2 pairs of parallel sides | 1<br>1<br>1 | SC1 for answer trapezium with reason <i>PM</i> parallel to <i>QR</i>  |
| 15        | $y < 8$<br>$y \geq 6 - x$ oe and $y \geq x + 2$ oe  | 1<br>3      | B2 for either $y \geq 6 - x$ oe or $y \geq x + 2$ oe<br>or<br>SC2 for $y = 6 - x$ oe and $y = x + 2$ oe<br>or SC1 for $y > 6 - x$ or $y = 6 - x$<br>or $y > x + 2$ or $y = x + 2$   |

|        |                                 |          |       |
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| Question. | Answer   | Mark  | Part Marks  |
|-----------|--|---|---|
| 16        | 1597 cao   | 4   | <p><b>B3</b> for 1597.39.. or 1597.3[9...] or 1597.4 or 6597<br/>or <b>B2</b> for 6597.3[9...] or 6597.4<br/>or <b>B1</b> for <math>5000\left(1 + \frac{2}{100}\right)^{14}</math></p> <p>If <b>B1</b> scored<br/>or<br/><b>B0</b> scored and an attempt at compound interest is shown<br/><b>SC1</b> for <i>their</i> 6597[...] – 5000 evaluated correctly provided answer positive<br/>and<br/><b>SC1</b> for <i>their</i> final answer rounded correctly to nearest \$ from their more accurate answer</p> |
| 17 (a)    | $2 \times 3 \times 5$  | 2   | <b>B1</b> for 2, 3, 5 as prime factors  |
| (b)       | 90   | 2   | <b>B1</b> for $90k$<br>or for listing multiples of each up to 90<br>or $2 \times 3^2 \times 5$  |
| 18        | <p>Correctly equating one set of coefficients</p> <p>Correct method to eliminate one variable</p> <p><math>x = 0.8</math></p> <p><math>y = -3</math></p> | <p><b>M1</b></p> <p><b>M1</b></p> <p><b>A1</b></p> <p><b>A1</b></p> | <p>Dependent on the coefficients being the same for one of the variables<br/>Correct consistent use of addition or subtraction using their equations</p> <p>If zero scored <b>SC1</b> for 2 values satisfying one of the original equations<br/>or<br/>if no working shown, but 2 correct answers given</p>   |
| 19 (a)    | 7.5  | 2   | <b>M1</b> for $[10] \times \frac{6}{8}$ oe  |
| (b)       | 12 cao   | 2   | <b>M1</b> for $9 \times \frac{8}{6}$ oe or $9 \times \frac{10}{\text{their (a)}}$   |
| 20 (a)    | $(p+t)(y+2x)$ final answer   | 2   | <b>B1</b> for $y(p+t) + 2x(p+t)$ or $p(y+2x) + t(y+2x)$   |
| (b)       | $7(h+k)(h+k-3)$ final answer   | 2   | <b>B1</b> for $7((h+k)^2 - 3(h+k))$<br>or $(h+k)(7(h+k) - 21)$  |

|        |                                 |          |       |
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| Question. | Answer   | Mark | Part Marks   |
|-----------|--|------|--|
| 21        | 285 cao  | 4    | <p><b>M1</b> for <math>\frac{1}{3} \times \pi \times 4^2 \times 9</math>, <math>48\pi</math></p> <p><b>M1</b> for <math>\frac{1}{2} \times \frac{4}{3} \times \pi \times 4^3</math>, <math>\frac{128\pi}{3}</math></p> <p><b>A1</b> for 284.8 to 284.9, <math>\frac{272\pi}{3}</math></p> <p>If <b>A0</b> then <b>B1</b> for <i>their</i> final answer rounded correctly to nearest whole number from their more accurate answer dependent on at least <b>M1</b></p> |
| 22 (a)    | $\begin{pmatrix} 22 & 17 \\ 18 & 7 \end{pmatrix}$            | 2    | <b>M1</b> for a $2 \times 2$ matrix with 2 correct elements  |
| (b)       | $\frac{1}{2} \begin{pmatrix} 4 & -3 \\ -6 & 5 \end{pmatrix}$ | 2    | <p><b>M1</b> for <math>\frac{1}{2} \begin{pmatrix} a &amp; b \\ c &amp; d \end{pmatrix}</math> or <math>k \begin{pmatrix} 4 &amp; -3 \\ -6 &amp; 5 \end{pmatrix}</math> soi</p> <p>or <math>\det = 2</math> soi</p>  |
| 23 (a)    | -13  | 1    |  |
| (b)       | $-3x - 1$ or $5 - 3(x + 2)$                                  | 1    |  |
| (c)       | $9x - 10$ cao  | 2    | <b>M1</b> for $5 - 3(5 - 3x)$  |
| (d)       | $\frac{5-x}{3}$ final answer oe                              | 2    | <p><b>M1</b> for correct first step e.g.</p> <p><math>y + 3x = 5</math> or <math>\frac{y}{3} = \frac{5}{3} - x</math> or <math>y - 5 = -3x</math> or</p> <p>better</p> <p>or</p> <p>for interchanging <math>x</math> and <math>y</math>, e.g. <math>x = 5 - 3y</math>, this does not need to be the first step</p>   |