



**Cambridge Assessment International Education**  
Cambridge International General Certificate of Secondary Education (9–1)

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**MATHEMATICS**

**0626/04**

Paper 4

**October/November 2017**

MARK SCHEME

Maximum Mark: 84

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**Published**

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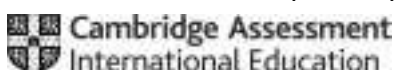
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**MARK SCHEME NOTES**

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

**Types of mark**

- M      Method marks, awarded for a valid method applied to the problem.
- A      Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.
- B      Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more ‘method’ steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation ‘**dep**’ is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

**Abbreviations**

|      |                            |
|------|----------------------------|
| awrt | answers which round to     |
| cao  | correct answer only        |
| dep  | dependent                  |
| FT   | follow through after error |
| isw  | ignore subsequent working  |
| nfww | not from wrong working     |
| oe   | or equivalent              |
| rot  | rounded or truncated       |
| SC   | Special Case               |
| soi  | seen or implied            |

| Question | Answer                                                                             | Marks     | Partial Marks                                                                                                                                                                            |
|----------|------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1(a)     | 4                                                                                  | 2         | <b>M1</b> for $\frac{11-3}{2-0}$ oe soi                                                                                                                                                  |
| 1(b)     | $[y =] 4x + 3$ oe                                                                  | 1         | <b>FT</b> from <i>their</i> gradient                                                                                                                                                     |
| 2        | 35, 70, 75                                                                         | 4         | <b>M1</b> for sum of angles in a triangle = 180 soi<br>or for 3 angles that fit two of the conditions<br><b>M1</b> for $2x$ and $x + 40$ oe<br><b>M1</b> for $x + 2x + x + 40 = 180$ soi |
| 3        | Correct angle bisector with correct arcs shown                                     | 2         | <b>B1</b> for angle bisector or correct arcs                                                                                                                                             |
| 4(a)     | 7                                                                                  | 1         |                                                                                                                                                                                          |
| 4(b)     | 3, 7, 31 (with no extras)                                                          | 2         | <b>B1</b> for two correct (with no extras) or for answer $[n =] 2, 3, 5$ only<br>or <b>M1</b> for 3, 7, 15, 31 seen                                                                      |
| 4(c)     | Valid reason                                                                       | 1         | e.g. Because 63 is divisible by 3 or 7 or 9 or 21<br>e.g. because 63 has more than 2 factors                                                                                             |
| 5(a)     | $\frac{2}{5}, \frac{4}{7}, \frac{3}{7}, \frac{4}{7}, \frac{3}{7}$ correctly placed | 2         | <b>B1</b> for $\frac{2}{5}$ or $\frac{3}{7}$ on a 'does not stop' branch                                                                                                                 |
| 5(b)     | $\frac{6}{35}$ oe                                                                  | 2         | <b>M1</b> for <i>their</i> $\frac{2}{5} \times \text{their } \frac{3}{7}$                                                                                                                |
| 6(a)     | $(x+3)(x-6)$                                                                       | 2         | <b>M1</b> for $x(x-6) + 3(x-6)$<br>or $x(x+3) - 6(x+3)$<br>or for $(x+a)(x+b)$ where $a+b = -3$<br>or $ab = -18$                                                                         |
| 6(b)     | $x = -3, x = 6$                                                                    | 1         | <b>FT</b> <i>their</i> factors                                                                                                                                                           |
| 7        | 60                                                                                 | 4         | <b>M1</b> for time for A to B = $125 \div 50$ soi<br><b>M1</b> for time for B to C = $4 - \text{their } 2.5$<br><b>M1</b> for $90 \div \text{their } 1.5$                                |
| 8        | $x^2 + 7x - 4x - 28$                                                               | <b>M1</b> | Must have at least 3 terms correct or<br>$x^2 + 3x - 28$ , must have at least 2 terms correct                                                                                            |
|          | $3x^2 - 3x$                                                                        | <b>B1</b> |                                                                                                                                                                                          |
|          | $x^2 + 7x - 4x - 28 + 3x^2 - 3x$<br>$= 4x^2 - 28 = 4(x^2 - 7)$                     | <b>A1</b> |                                                                                                                                                                                          |

| Question | Answer                                                           | Marks | Partial Marks                                                                                                                                                        |
|----------|------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9(a)(i)  | 18                                                               | 1     |                                                                                                                                                                      |
| 9(a)(ii) | 14                                                               | 2     | <b>B1</b> for 26 or 12<br>or <b>M1</b> for attempt at difference of quartiles                                                                                        |
| 9(b)     | 15                                                               | 3     | <b>B2</b> for answer 85<br><br>OR<br><br><b>M1</b> for $[t < 30] = 102$ or $[t > 30] = 18$ seen<br><b>M1</b> for $\frac{120 - \text{their } 102}{120}$ soi           |
| 10(a)    | $3k^7$                                                           | 1     |                                                                                                                                                                      |
| 10(b)    | $\frac{5}{2}$ oe                                                 | 2     | <b>M1</b> for $\frac{2}{5}$ seen or $\left(\frac{25}{4}\right)^{\frac{1}{2}}$                                                                                        |
| 10(c)    | $\frac{1}{3}$                                                    | 1     |                                                                                                                                                                      |
| 11       | $12x^3$                                                          | 4     | <b>M1</b> for $2x \times 2x \times 2x$<br><b>M1</b> for $\frac{1}{3} \times 2x \times 2x \times (5x - 2x)$<br><b>M1</b> for <i>their</i> $8x^3 - \text{their } 4x^3$ |
| 12       | 270                                                              | 3     | <b>B2</b> for $\left(\frac{9}{6}\right)^3$ or $\left(\frac{6}{9}\right)^3$ oe soi<br>or <b>B1</b> for $\frac{9}{6}$ or $\frac{6}{9}$ oe soi                          |
| 13       | $\frac{26}{33}$                                                  | 3     | <b>M2</b> for $x = \frac{78}{99}$<br>or <b>M1</b> for $x = 0.\dot{7}8$ and $100x = 78.\dot{7}8$ soi                                                                  |
| 14(a)    | 5                                                                | 1     |                                                                                                                                                                      |
| 14(b)    | 36 700                                                           | 1     |                                                                                                                                                                      |
| 14(c)    | 6                                                                | 1     |                                                                                                                                                                      |
| 15(a)    | $\begin{pmatrix} 12 & 9 \\ 18 & 21 \end{pmatrix}$                | 1     |                                                                                                                                                                      |
| 15(b)    | 10                                                               | 1     |                                                                                                                                                                      |
| 15(c)    | $\frac{1}{10} \begin{pmatrix} 7 & -3 \\ -6 & 4 \end{pmatrix}$ oe | 1     | <b>FT</b> from <i>their</i> determinant.                                                                                                                             |

| Question | Answer                                                                                                                                    | Marks     | Partial Marks                                                                                                                                                                                                                                                                                                     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16       | $(-1\frac{1}{2}, 1\frac{1}{2}), (2, 5)$                                                                                                   | 5         | <b>M1</b> for $2x^2 - 3 = x + 3$<br><b>M1</b> for $2x^2 - x - 6 = 0$<br><b>M1</b> for $(2x + 3)(x - 2) = 0$<br><b>A1 FT</b> from <i>their</i> factorised quadratic,<br>for $x = -1\frac{1}{2}$ or 2<br>After A0,<br><b>SC1</b> for <i>their</i> $x$ co-ordinates being +3 more than <i>their</i> $y$ co-ordinates |
| 17(a)    | Total of flour in grams is<br>$250x + 375y$                                                                                               | <b>M1</b> |                                                                                                                                                                                                                                                                                                                   |
|          | $250x + 375 \leq 6000$<br>$\rightarrow 2x + 3y \leq 48$                                                                                   | <b>A1</b> |                                                                                                                                                                                                                                                                                                                   |
| 17(b)    | $x + y \leq 20$ oe<br>$y \geq 3$ oe                                                                                                       | 2         | <b>B1</b> for each<br>or <b>SC1</b> for $x + y * 20$ <b>and</b> $y * 3$<br>where * can be an equals or any inequality sign.                                                                                                                                                                                       |
| 17(c)    | Correct region clearly identified                                                                                                         | 4         | <b>B3</b> for three correct boundaries<br>$2x + 3y = 48, x + y = 20, y = 3$<br>or <b>B2</b> for two correct boundaries<br>or <b>B1</b> for one correct boundary                                                                                                                                                   |
| 17(d)    | 116                                                                                                                                       | 2         | <b>M1</b> for $x = 12$ and $y = 8$ identified<br>or for $5x + 7y$ for integer $(x, y)$ in their region                                                                                                                                                                                                            |
| 18       | $g = 3$<br>$h = -5$                                                                                                                       | 4         | <b>B3</b> for one correct<br>OR<br><b>M1</b> for $2x^3 - 2gx^2 + x^2 - gx - 15x + 15g$<br>or $(x - g)(2x - 5)(x + 3)$<br><b>M1</b> for $2x^3 + hx^2 - 18x - 9h$<br>or $(x - 3)(x + 3)(2x + h)$                                                                                                                    |
| 19(a)    | $2\mathbf{q} - 2\mathbf{p}$ oe                                                                                                            | 3         | <b>M1</b> for $\overrightarrow{DA} = -2\mathbf{p}$ or $\overrightarrow{AX} = 2\mathbf{q}$ or $\overrightarrow{BX} = -\mathbf{q}$<br><b>M1</b> for $\overrightarrow{DX} = \overrightarrow{DA} + \overrightarrow{AX}$ oe soi                                                                                        |
| 19(b)    | $\overrightarrow{DY} = 3\mathbf{q} - 3\mathbf{p}$ [= $3(\mathbf{q} - \mathbf{p})$ ]<br>or $\overrightarrow{XY} = \mathbf{q} - \mathbf{p}$ | <b>M1</b> |                                                                                                                                                                                                                                                                                                                   |
|          | which is a multiple of $\overrightarrow{DX}$<br><b>and</b> $X$ is on $DX$ and on $DY$ oe                                                  | <b>A1</b> |                                                                                                                                                                                                                                                                                                                   |

| Question | Answer                                                                      | Marks     | Partial Marks                                                                                                                                                  |
|----------|-----------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20       | 243 and 297                                                                 | 3         | <b>B2</b> for one correct<br>or <b>M1</b> for $180 + 63$ or $360 - 63$ oe<br>or <b>M1</b> for sketch of sine curve for $0^\circ \leq x \leq 360^\circ$<br>seen |
| 21       | $\frac{2}{\sqrt{27}} = \frac{2}{3\sqrt{3}}$                                 | <b>M1</b> | $\frac{2\sqrt{3} + \sqrt{27}}{\sqrt{27} \times \sqrt{3}}$                                                                                                      |
|          | $\frac{5}{3\sqrt{3}}$                                                       | <b>M1</b> | $\frac{2\sqrt{3} + \sqrt{27}}{\sqrt{81}}$ or numerator $2\sqrt{3} + \sqrt{27}$ or better                                                                       |
|          | $\frac{5}{3\sqrt{3}} = \frac{5 \times \sqrt{3}}{3\sqrt{3} \times \sqrt{3}}$ | <b>M1</b> | $\frac{2\sqrt{3} + 3\sqrt{3}}{9}$                                                                                                                              |
|          | $\frac{5\sqrt{3}}{9}$                                                       | <b>A1</b> | $\frac{5\sqrt{3}}{9}$                                                                                                                                          |