**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

# MARK SCHEME for the October/November 2012 series

# 4024 MATHEMATICS (SYLLABUS D)

**4024/12** Paper 1, maximum raw mark 80

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 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

CAMBRIDGE
International Examinations

**Abbreviations**

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working
soi seen or implied

| Qu. | Answers | Mark | Part Marks |
|---|---|---|---|
| 1 | **(a)** 10.6 | 1 | |
| | **(b)** $\frac{3}{50}$ cao | 1 | |
| 2 | **(a)** $2\frac{11}{12}$ | 1 | |
| | **(b)** 4 cao | 1 | |
| 3 | **(a)** 34 | 1 | |
| | **(b)** 10 | 1 | |
| 4 | **(a)** $3\frac{1}{2}$ oe | 1 | |
| | **(b)** oe | 1 | |
| 5 | $-1, -\frac{17}{20}, -\frac{4}{5}, 0, \frac{3}{4}$ | 2 | **C1** for 4 correct when one is covered or **C1** for reversed answer |
| 6 | **(a)** 3 (h) | 1 | |
| | **(b)** 35 or ft $\frac{50 + 90}{\text{their (a)} + 1}$ | 1√ | |
| 7 | **(a)** $8k + 1$ | 1 | |
| | **(b)** $2x^2 + 5x - 12$ | 1 | |
| 8 | **(a)** 255° | 1 | |
| | **(b)** (0)7 h 53 min | 1 | |
| 9 | **(a)** 6 | 1 | |
| | **(b)** 11 | 1 | |
| 10 | **(a)** $2^2 \times 3^2 \times 5$ oe | 1 | |
| | **(b)** 11 www | 1 | |

© Cambridge International Examinations 2012

| | | | |
|---|---|---|---|
| **11** | **(a)** 6<br>**(b)** $\frac{1}{3}$ | **1**<br>**1** | |
| **12** | 18 | **2** | **B1** for "k" = 2 or **B1** for $\frac{32}{4^2} = \frac{y}{3^2}$ oe |
| **13** | **(a)** 9.45<br>**(b)** 1.95 or *their* **(a)** – 7.5 | **1**<br>**1**√ | |
| **14** | **(a)** Both $p = 6$ and $q = 4$<br>**(b)** 33 or f.t. 29 + their $q$ (provided $q$ has a value)<br>**(c)** 34 | **1**<br>**1**√<br>**1** | |
| **15** | **(a)** $4p\,(4 + p)$<br>**(b)** $(x + 2a)(y + 3a)$ | **1**<br>**2** | **B1** for **any** partial factorisation |
| **16** | **(a)** 0<br>**(b)**<br>**(c)** $\frac{1}{3}$ or f.t from table $\frac{\text{their (number of 7s)}}{\text{total no. of outcomes}}$ provided (number of 7s) > 0 | **1**<br>**1**<br>**1**√ | |
| **17** | **(a)** 0.0406<br>**(b)** $6.8(00..) \times 10^{-4}$<br>**(c)** 4 | **1**<br>**1**<br>**1** | |
| **18** | **(a)** 3<br>**(b)** $13\frac{1}{2}$ oe<br>**(c)** $4\frac{1}{2}$ oe | **1**<br>**1**<br>**1** | |
| **19** | **(a)**<br>**(b)** or $\begin{pmatrix} \frac{3}{4} & -\frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix}$ oe | **2**<br>**2** | **C1** for 2 or 3 correct elements<br>**B1** for det M = 4 or for $\frac{1}{4} \times$ (2 × 2 matrix) or **B1** for used or seen |

© Cambridge International Examinations 2012

| | | | |
|---|---|---|---|
| **20** | **(a) (i)** 4<br><br>**(ii)** 2<br><br>**(b)** Both $a = 1$ and $b = 2$.<br>$c = 6$ | **1**<br><br>**1**<br><br>**1**<br>**1** | |
| **21** | **(a)**<br><br>**(b)** (one way) stretch<br><br>Parallel to $y$-axis/$x$-axis invariant **and** (stretch/scale) factor $\frac{1}{2}$. | **2**<br><br>**1**<br><br>**1 dep.** | **C1** for 4 or 5 correct elements in a 2 × 3 derived matrix |
| **22** | **(a)** (11, 3)<br><br>**(b)** parallelogram<br><br>**(c)** 27 | **1**<br><br>**1**<br><br>**2** | <br><br><br><br>**M1** for their ($BC$) × their 9<br>or<br>**M1** for 9 × (their $BC$ + 2) – 2 × $\frac{1}{2}$ × 9 × 2 |
| **23** | **(a)** 124<br><br>**(b)** 118<br><br>**(c)** 31<br><br>**(d)** 38 | **1**<br><br>**1**<br><br>**1**<br><br>**1** | |
| **24** | **(a)** 18<br><br>**(b) (i)** 10<br>**(ii)** 20 | **2** | **M1** for $\frac{360}{\text{their } (180 - 160)}$<br><br>or **M1** for $(n - 2) \times 180 = 160n$ oe |
| **25** | **(a)** $\frac{u}{5}$ or any equiv.<br><br>**(b) (i)** correct method<br>$u = 2$<br><br>**(ii)** continuous graph from (0, 0) to (10, 40),without any horizontal or vertical lines. Curve, concave upwards | **1**<br><br>**M1**<br>**A1**<br><br>**1**<br>**1 ind.** | <br><br>e.g. $40 = \frac{1}{2} \times (u + 3u) \times 10$,<br>or $40 = 10u + \frac{1}{2} \times 10 \times 2u$ |

© Cambridge International Examinations 2012

| | | | |
|---|---|---|---|
| **26** | **(a)** 2011 | **2** | **B1** for ($n$ = ) 223 seen |
| | **(b)** 36 | **1** | |
| | **(c)** **(i)** $9x - 9y$, or $9y - 9x$ , or any equiv. | **1** | |
| | **(ii)** "123 is not a multiple of 9" oe | **1** | |
| **27** | **(a)** 126° to 128° inclusive | **1** | |
| | **(b)** acceptable quadrilateral $ABCD$ | **1** | |
| | **(c)** **(i)** acceptable circular arc, centre C | **1** | |
| | **(ii)** acceptable bisector of angle $ABC$ | **1** | |
| | **(d)** $DP$ = 2 to 2.5cm with correct $P$ | **1** | dep. on an acceptable $D$ and both **(c)** marks |

© Cambridge International Examinations 2012