UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

4024 MATHEMATICS

4024/01 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 must be read in conjunction with the question papers and the report on the examination.

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UNIVERSITY of CAMBRIDGE International Examinations

1	**(a)**	$\frac{2}{21}$	1	Accept 0.095(238...) , 9.5(...) x 10^{-2}
	(b)	$\frac{5}{6}$ cao	1	
2	**(a)**	A pair of brackets around 7 – 5	1	Condone extra **pairs** of brackets (but not a single full bracket) provided result is correct.
	(b)	0.054 or equiv	1	e.g. $\frac{27}{500}$, 5.4 x 10^{-2} , 00.054(0)
3		0.39, $\frac{2}{5}$, $\frac{9}{20}$, 46% Accept correct equivalent values, e.g. 0.39, 0.4, 0.45, 46%	2	or **C1** for the reversed order or **C1** for 3 in the correct order when one is covered up, e.g. 0.39, $\frac{9}{20}$, $\frac{2}{5}$, 46% (cover up $\frac{9}{20}$ or $\frac{2}{5}$). Cover the most favourable value.
4	**(a)**	98, 2×7^2 , $2 \times 7 \times 7$	1	
	(b)	28	1	Accept $2^2 \times 7$ for 28.
5	**(a)**	08 45, 8 45 (a.m.)	1	
	(b)	775	1	
6		12.5, $12\frac{1}{2}$, $\frac{25}{2}$	2	Not $12\frac{2}{4}, \frac{50}{4}$, or worse (these equiv. values get **B1** by implication). or **B1** for correct evaluation of their constant; 1000 from $y = \frac{k}{x}$, $\frac{1}{1000}$ from $y = \frac{1}{kx}$. Condone 250×4 for 1000 or for $4 \times 250 = x \times 80$ o.e.
7	**(a)**	China	1	
	(b)	1.125×10^8 , 1.13×10^8	2	**C1** for figs 1125 or for figs 113. or **C1** for $A \times 10^8$, where $1.01 < A < 1.14$ and $A \neq 1.125, 1.13$ For other A values give **B1** if 1.125×10^8 or 1.13×10^8 seen in working.

8	**(a)**	60 cao	1	
	(b)	13 or their **(a)** – 47 provided their **(a)** > 47	2 √	or **B1** for 78(°) seen anywhere or for Silver = 20 soi, or for Other = 15 soi. or **M1** for $\frac{360-(72+120+90)}{360}\times$ their **(a)**. N.B. Working for **(b)** may appear in working for **(a)**, or on the diagram.
9	**(a)**	800 , 8×10^2	1	
	(b)	$(m=)\ \frac{Ft}{v-u}$, $Ft/(v-u)$	2	Accept equiv. negatives e.g. $\frac{-Ft}{u-v}$ or **C1** for $Ft/v-u$ or **B1** for $Ft=m(v-u)$
10	**(a)**	(–) 4.83	1	
	(b)	**(i)** 10 06 (h) or 10.06	1	Accept 10 h 6 (m), 10 6 a.m., 6 mins past 10;
		(ii) (–) 0.59	1	
11	**(a)**	1	1	
	(b)	2.9, $2\frac{9}{10}$, $\frac{29}{10}$	2	or **M1** for attempting to find the products (nos. of pets) × frequencies (condone a missing 0 × 2) **and** for attempting to add these products – implied by seeing 58.
12	**(a)**	–5 cao	1	
	(b)	$2\frac{1}{3}$, $\frac{7}{3}$, 2.33 or better	2	or **B1** for $p=4p-7$ oe, soi by e.g., $3p=7$ or $-3p=-7$ or $p=\frac{-7}{-3}$
13	**(a)**	$\frac{13m}{20}$, $0.65m$	1	
	(b)	$(x)>10$	2	or **C1** for 10 on its own, or for $10<x$ or **B1** for $2x>20$, or for $20<2x$ seen or **B1** for $x>\frac{20}{2}$, or for $\frac{20}{2}<x$ seen

14	**(a)**	(0, 7.5) oe	1	
	(b)	**(i)** –1.5 oe	1	e.g. $\frac{6}{-4}$
		(ii) (1, 7) cao	1	
15	**(a)**	$\begin{pmatrix}1\\10\end{pmatrix}$	1	
	(b)	**(i)** (±) 5 cao	1	
		(ii) 2 cao	1	
16	**(a)**	**(i)** 24.9 to 26.1 inclusive	1	
		(ii) 111° to 115° inclusive	1	
	(b)	*H* marked 6.5 cm from *F* and 5 cm from *G* (both within 2 mm) **and** above *FG*.	1	
17	**(a)**	6	1	
	(b)	Rectangle, base 3 to 3.5, height 16	1	Allow all measurements to within 1 mm.
		Rectangle, base 3.5 to 4.5, height 4	1	
18	**(a)**	(0)69°	1	
	(b)	**(i)** 1 : 3 oe (numerical)	1	
		(ii) 9 : 8 oe (numerical)	2	or √ **B1** for squaring their **(b)(i)**.
19	**(a)**	**(i)** $7a(3a-2)$	1	
		(ii) $(x-8)(x+5)$	1	
	(b)	$-4\frac{1}{2}$ or any equiv.	2	or **C1** for $4\frac{1}{2}$ or any equiv. or **B1** for $k=3$, or for seeing $(y-3)$ as a factor of the quadratic, e.g. $2y^2+ky-27=(y-3)(\ \ldots.\ )$

20	**(a)**	(0)35°	2	Check diagram for relevant working or if Ans. space is blank. or **B1** for seeing $\angle AOE = 70°$.
	(b)	**(i)** (0)55°	1	
		(ii) 125° or f.t. 180 – their **(b)(i)**	1 √	
21	**(a)**	$\frac{5}{7}$, $\frac{2}{7}$ correctly placed	1	
	(b)	**(i)** $\frac{5}{14}$	1	In **(b)**, accept equivalent fractions but deduct a 1 mark penalty, once.
		(ii) $\frac{25}{28}$	2	or **M1** for starting a complete, correct method, e.g. $\frac{5}{8}\times\frac{4}{7}+\frac{5}{8}\times\frac{3}{7}+\frac{3}{8}\times(their\ \frac{5}{7})$ or $\frac{5}{8}+\frac{3}{8}\times(their\ \frac{5}{7})$ $\{\frac{5}{8}\times\frac{4}{7}$ may appear as $\frac{5}{14}$ or *their* **(b)(i)**$\}$ or $1-\frac{3}{8}\times(their\ \frac{2}{7})$, provided *their fractions* are between 0 and 1
22	**(a)**	36, 11, 15	2	or **C1** for two correct
	(b)	**(i)** n^2 oe	1	
		(ii) $2n - 1$ oe	1	
23	**(a)**	**(i)** 102.5(0)	1	
		(ii) 70	2	or **M1** for $\frac{figs\ 175}{figs\ 25}$, or **M1** for $100 - \frac{7.5}{25}\times 100$
	(b)	20	2	or **M1** for $\frac{12}{0.6}$ oe, e.g. $\frac{k\times 100}{5k}$

24	**(a)**	(2, 5.5)	3	Accept **any** equiv. for 2 and for 5.5. or **B2** for $x = 2$ or for $y = 5.5$ seen in wkg or **M1** for an attempt that leads to a linear equation in one unknown.
	(b)	$y > -2$ oe $x + 4y < 24$ oe	1 1	e.g. $y + 2 > 0$
25	**(a)**	**(i)** $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$	1	
		(ii) 3	1	
	(b)	**(i)** Reflection in $y = -x$ oe	1	
		(ii) (–1, 1)	2	or **B1** for reflection of A in $x = -1$