UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2007 question paper

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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International Examinations

1	**(a)**	$\frac{9}{40}$ cao	1	
	(b)	0.018 or equiv.	1	e.g. $\frac{9}{500}$, 1.8×10^{-2}
2	**(a)**	$\frac{8}{9}$ cao	1	
	(b)	$\frac{1}{6}$ cao	1	
3	**(a)**	4.32(0)	1	not 4320. Accept $4\frac{32}{100}$ or equiv.
	(b)	$(-1)^3$, 3^{-1}, 3^0, 3^1	1	Accept corresponding correct values
4	**(a)**	56°	1	
	(b)	2 cm	1	
5	**(a)**	375	1	
	(b)	27	1	
6	**(a)**	6	1	
	(b)	$3 - 2x$	1	Accept any correct equiv.
7		rectangle from 4-5 height 20 rectangle from 5-8 height 5	1 1	
8	**(a)**	$y > 1$, $y < 2x$ or equiv.	1+1	or sc1 for using the two correct equations but with the wrong inequalities
	(b)	3	1	
9	**(a)**	$B \cap C \cap A'$	1	
	(b)	(i) 31 (ii) 9 or f.t. 40 – their (b)(i)	1 1 √	
10	**(a)**	$\begin{pmatrix} 8 & -3 \\ 9 & -4 \end{pmatrix}$	1	
	(b)	$\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$	1	
	(c)	$\begin{pmatrix} 0 & \frac{1}{3} \\ -1 & 1\frac{1}{3} \end{pmatrix}$	1	Allow $\frac{1}{3}\begin{pmatrix} 0 & 1 \\ -3 & 4 \end{pmatrix}$ Accept decimals to 2 d.p. or better.
11	**(a)**	5.35 5.45 82.5 87.5 all correct	2	or B1 for 2 or 3 correct
	(b)	189.5 g or f.t. from their lower bounds	1 √	
12	**(a)**	120 newtons	1	
	(b)	8	2 *	or B1 for "k" = 24

13	**(a)**	4 minutes	1	
	(b)	st. line from (0,0) to (their (a), 2*h*) st. line from (their (a), 2*h*) to (12, 3*h*)	1 1	sc1 for a single straight line from (0,0) to (12,3*h*) regardless of the value in (a).
14	**(a)**	$x = 28$	1	
	(b)	$y = \frac{2}{3}$ (accept 0.66... or better)	2 *	or B1 for $-10 + 2y$ or $-5 + y$ seen
15		Any 3 correct columns in their table. Most possible values are given here:	1 *	

W	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
L	33	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3
A	99	124	145	162	175	184	189	190	187	180	169	154	135	112	85	54

		Length = 19 m Area = 190 m^2	1 1	
16		$x = 7$ $y = -2$ both	3	or B2 for either or B1 for a pair of values that fits either equation
17	**(a)**	**(i)** 5×10^{-2}	1	
		(ii) 2×10^2	1	
	(b)	**(i)** $2 \times 3^2 \times 5^3$ (or $2^1 \times 3^2 \times 5^3$)	1	Accept 3x3 etc.
		(ii) $n = 12$	1	
18	**(a)**	$\frac{360}{180-165}$ or $180(n-2) = 165n$ or equiv M1		
		24 A1	2 *	
	(b)	45	2 *	or B1 for 30 or 150 seen
19	**(a)**	40	2 *	or sc1 for 48 or 50, or for an answer that rounds to 40 or B1 for both 16 and 30, or 480, or $\sqrt{150} \approx 12$ seen
	(b)	$\frac{\text{their100m}}{\text{their12s}}$ or 500 x 60 M1		
		30 km/h A1	2 *	Accept 29.8 to 30.31
20	**(a)**	$3a^2(5 + 4a)$	1	
	(b)	$(1 - 4b)(1 + 4b)$	1	
	(c)	$(3c - d)(2x - y)$	2 *	or B1 for correct, partial factorisation of any two terms

21	**(a)**	$h = \frac{1}{4}$ or 0.25	1	
	(b)	**(i)** $\frac{3}{10}$ or 0.3	1	
		(ii) 0 cao	1	
		(iii) $\frac{1}{10}$ or 0.1	1	
22	**(a)**	clear $30 + (300 - \frac{1}{2} \times 30 \times "12") \div "12"$ M1 40 s A1	2 *	or sc1 for a final answer of 10 or B1 for 180 or 120 seen
	(b)	tangent drawn at $t = 55$ T1		no "daylight", nor freehand
		0.12 to 0.24 (+ or -) B1	2 *	dep. on using an acceptable tangent
23	**(a)**	20°C	1	
	(b)	**(i)** 4°C	1	
		(ii) 2400 m	1	
		(iii) $16 - \frac{x}{150}$	2	or sc1 for $\frac{\text{their (a)}}{3000} \times \text{x}$
24	**(a)**	(4) 8, 16, 12	1	
	(b)	$x = 2n$	1	
		$y = n^2$	1	
		$z = n^2 - n$ or equiv	2	or sc1 for a correct expression in terms of x and/or y (and possibly also including the variable n)
25	**(a)**	293° to 295°	1	
	(b)	completed ΔACD **with two arcs** at D	1	within 2 mm of correct pt
	(c)	**(i)** perp. bisector of AC	1	within 2 mm, 2^o
		(ii) line parallel to AB, 5 cm above AB	1	within 2 mm Accept dashed lines.
	(d)	CP = 6.3 to 6.7	1	dep. on the correct loci and the label P at their intersection