Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2016**

MARK SCHEME

Maximum Mark: 96

Published

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.

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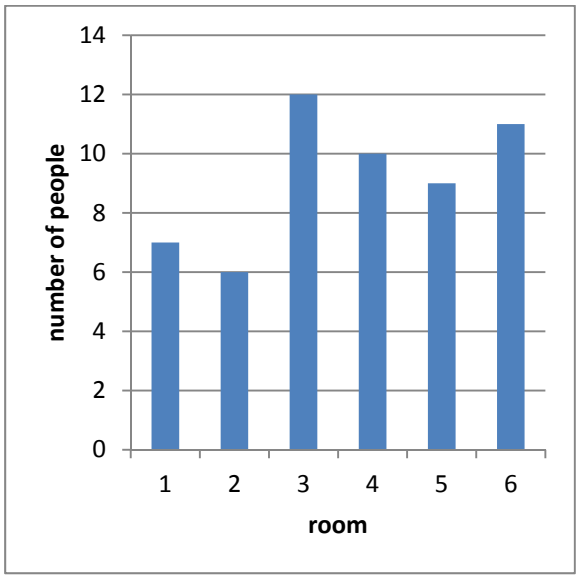
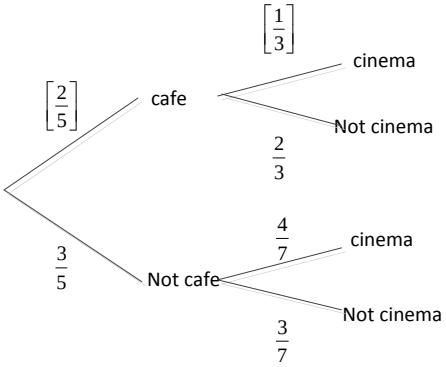
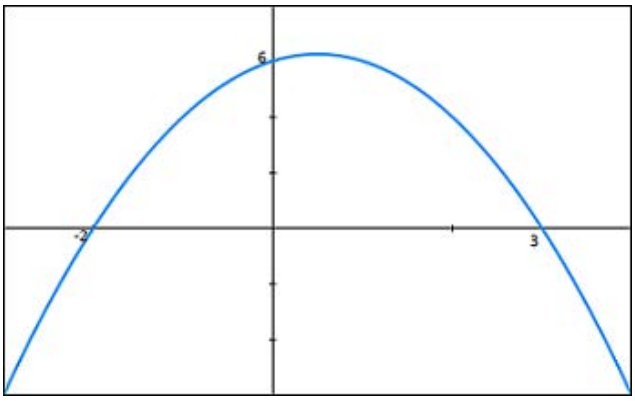
Abbreviations

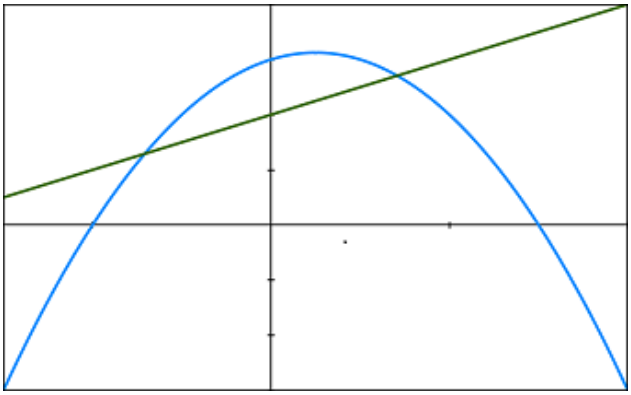
awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

Question	Answer	Mark	Part Marks
1 (a)	Square equilateral triangle hexagon	1 2 1	 **B1** for each word
(b)	[x =] 16 [y =] 8	3	**B2** for 1 correct or **M1** for 12×4 soi
2 (a)	55	1	
(b)		2	**B1** for 3 bars with correct height and equal width or 5 bars with correct height
(c) (i)	1800	1	
(ii)	30	1	
(iii)	348	2	**M1** for 6×8 oe
3 (a) (i)	21 or 9	1	
(ii)	–6 or –18	1	
(iii)	9	1	
(iv)	$\frac{5}{8}$ oe	1	

Question	Answer	Mark	Part Marks
(v)	$\sqrt{3}$ or π	1	
(b) (i)	1.7321	1	
(ii)	1.732	1	
(c)	$\frac{33}{100}$	1	
(d)	3.4	1	
(e)	62.5	1	
4 (a) (i)	M O E Y cao	2	**B1** for 2 correct and none incorrect or 3 correct and 1 extra
(ii)	O N	2	**B1** for 1 correct and none incorrect or 2 correct and 1 extra
(b) (i)	[*AB* =] 12 [*DF* =] 5	3	**B2** for 1 correct or **M1** for a correct ratio, equation or correct Pythagoras statement.
(ii)	54 : 6 oe	2 FT	**FT** *their AB* **B1** for 54 or 6 seen or 3^2 seen or **M1** for $0.5 \times 4 \times 3$ or $0.5 \times 9 \times$ *their AB*
5 (a)	19	1	
(b)	18	1	
(c)	2	2	**M1** for 17 or 19 seen
(d)	18.34	2	**M1** for multiplying number of petals by frequencies
6 (a)	298 291	1 1 FT	 **FT** *their*298 – 7
(b)	$333 - 7n$ oe	2	**B1** for $333 - kn$ or $k - 7n$
(c)	Yes, with correct justification soi	1	

Question	Answer	Mark	Part Marks
7 (a)	$[a =]31$	**1**	
	$[b =]42$	**1**	
	$[c =]107$	**1**	
	$[d =]107$	**1**	
(b)	$[p =]28$	**1**	
	$[q =]90$	**1**	
	$[r =]62$	**1**	
8 (a)		**3**	**B1** for $\frac{3}{5}$ **B1** for $\frac{2}{3}$ **B1** for $\frac{4}{7}$ or $\frac{3}{7}$
(b)	$\frac{2}{15}$ oe	**2**	**M1** for $\frac{2}{5} \times \frac{1}{3}$
(c)	$\frac{10}{21}$ oe	**3**	**M2** for $their(\text{b}) + their\frac{3}{5} \times their\frac{4}{7}$ or **M1** for $their\ \frac{3}{5} \times their\ \frac{4}{7}$
9 (a)	1.2	**3**	**M2** for $\frac{\frac{100}{1000}}{\frac{5}{60}}$ oe seen or **M1** for $\frac{100}{1000}$ or $\frac{5}{60}$ or $\frac{100}{5}$ oe seen
(b) (i)	9	**3**	**M2** for $\frac{6}{40} \times 60$ oe or **M1** for $\frac{6}{40}$
(ii)	[0]8 04	**1 FT**	**FT** 07 55 + *their*(b)(i)
(iii)	[0]7 55 + *their* (b)(i) + 5 minutes oe	**1 FT**	**FT** providing before 08 15

10 (a) (i)	2	**2**	**M1** for correct first step
(ii)	$x < 5$	**2**	**M1** for correct first step. Allow $=, \leqslant, >, \geqslant$ for M1
(b)		**1**	
(c) (i)	$12x^8$	**2**	**B1** for $12x^k$ or kx^8
(ii)	$3y^6$	**2**	**B1** for $3y^k$ or ky^6
(d)	2 drink + 4 chocolate = 6.10 oe [1] chocolate = 0.85 [1] drink + 2(0.85) = 3.05 oe [1] drink = 1.35	**M1** **A1** **M1** **A1**	**SC2** for correct answer with no working.
11 (a)	4.24 or 4.241 to 4.242	**2**	**M1** for $\pi \times 1.5^2 [\times 0.6]$ or better
(b)	5.5[0] or 5.497 to 5.498	**2 FT**	**M1** for $\pi \times 2^2$ seen
(c)	59.4 or 59.43 to 59.44	**2**	**M1** for $6 \times 12 -$ an area seen
12 (a) (i)	Fully correct sketch 	**2**	**B1** for axes intercepts approximately correct **B1** for correct shape
(ii)	(0, 6)	**1**	
(iii)	(–2, 0) (3, 0)	**1** **1**	
(iv)	(0.5, 6.25)	**1**	

(b) (i)	Correct line 	**2**	**B1** for approximately correct slope **B1** for approximately correct y intercept
(ii)	(1.41, 5.41) (−1.41, 2 .59)	**1** **1**	