CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/41 Paper 4 (Extended), maximum raw mark 120

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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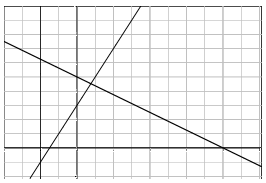
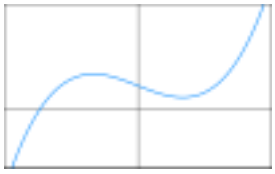
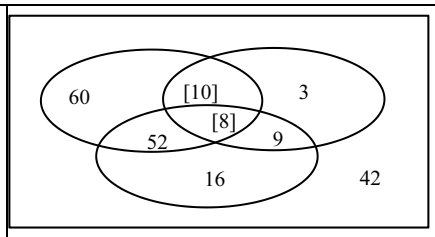
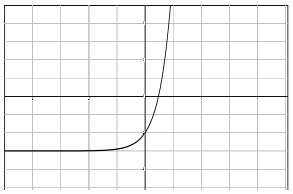
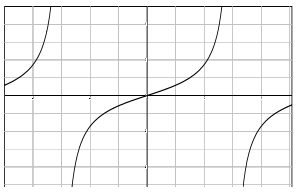
CAMBRIDGE
International Examinations

1 (a)	$x = -2$ drawn and ruled $y = 2x + 3$ drawn and ruled	**1** **2**	**B1** for ruled line with positive gradient through (0, 3) or ruled line gradient 2 or correct line freehand
	Correct region clearly indicated 	**1**	
(b)	4.52	**3**	**B2** if given in co-ordinates or **M1** for substituting $y = 2x + 3$ in $5x + 8y = 40$ or y coefficients correctly eliminated **A1** for $x = 0.7619$ to 0.762 or **M2** for x coefficients correctly eliminated or **M1** for $y = \frac{40 - 5x}{8}$ oe **SC2** for $\frac{95}{21}$ oe
2 (a)	Plotting 4 points correctly	**2**	**B1** for 2 or 3 correct
(b)	Negative	**1**	Ignore comment on strength
(c)	$[y =] -0.429x + 72.2$	**2**	$a = -0.4295$ to -0.4294 $b = 72.17$ to 72.18 **B1** for either a or b correct or **SC1** for $y = -0.43x + 72$
(d) (i)	61 [.0...]	**1FT**	**FT** *their* equation. Allow integer.
(ii)	Weak correlation oe	**1**	Allow "no correlation" if answer to **(b)** is no correlation

3 (a)	 Cubic (positive x^3) with turning points in correct quadrants.	**2**	**B1** for any cubic (positive x^3)
(b)	Rotational order 2 about (0, 4)	**1** **1** **1**	
(c)	(–1, 6) (1, 2)	**1** **1**	**SC1** answers reversed
(d)	$x < -1.53$ or –1.532… $x > -0.347$ or –0.3473 to –0.3472, $x < 1.88$ or 1.879…	**1** **1** **1**	
4 (a) (i)	28 $4n$ 13 $2n - 1$ oe	**1** **1** **1** **2**	**B1** for $2n + k$
(ii)	199	**1FT**	**FT** from *their* $2n - 1$ (not $n + 2$)
(b) (i)	40	**1**	
(ii)	$n^2 + 3n$ oe	**3**	**M2** for $n^2 + bn$ or **M1** for 2nd differences found or $an^2 + bn + c,\ a \neq 0$

5	**(a)**	2.83 or 2.828…	**4**	**M2** for $\sqrt{0.9^2 - 0.7^2}$ or **M1** for $x^2 + 0.7^2 = 0.9^2$ or better and **M1 FT** for *their* $0.5657 \times 2 \times 2.5$ oe
	(b)	$\cos[\theta] = \frac{0.7}{0.9}$ oe	**M1**	or **M2** for $\cos[\theta] = \frac{0.9^2 + 0.9^2 - (\textit{their } AB)^2}{2 \times 0.9 \times 0.9}$
		×2	**M1**	or **M1**for *their* $AB^2 = 0.9^2 + 0.9^2 - 2 \times 0.9 \times 0.9 \times \cos\theta$
		77.85 to 77.89	**A1**	
	(c)	5980 or 5975 to 5976	**5**	**M1** for correct method for triangle *OAB* and **M1** for correct method for either sector and **M1** for completion to volume of prism and **M1** for their volume (m³) × 1000
6	**(a)** **(i)**	$\mathbf{a} + \mathbf{b}$	**1**	
	(ii)	$-\frac{2}{3}\mathbf{a} + \frac{1}{3}\mathbf{b}$ oe	**2**	**B1** unsimplified
	(b)	Correct route for *EB*	**M1**	
		Completion to $-\frac{2}{3}\mathbf{a} + \frac{1}{3}\mathbf{b}$	**A1**	
	(c) **(i)**	*AD* = *EB* *AD* // *EB*	**1**	Accept in words Not $\overrightarrow{AD} = \overrightarrow{EB}$
	(ii)	Parallelogram	**1**	

7 (a)		**3**	**B2** for 4 correct or **B1** for 2 correct
(b) (i)	$\frac{42}{200}$ oe	**1FT**	**FT** *their* 42
(ii)	$\frac{9}{200}$ oe	**1FT**	**FT** *their* 9
(c) (i)	$\frac{870}{39800}$ oe	**2**	**M1** for $\frac{30}{200}\times\frac{29}{199}$ oe
(ii)	$\frac{1920}{39800}$ oe	**3**	**M2 FT** for $\frac{60}{200}\times\frac{16}{199}+\frac{16}{200}\times\frac{60}{199}$ oe **M1 FT** for one of above products
8 (a) (i)	58	**1**	
(ii)	67	**2**	**B1** for $ABC = 125$ or $ADE = 67$
(b) (i)	2 from $PXS = QXR$ ([vertically] opposite angles) $SPX = RQX$ ([angles in] same segment) oe $PSX = QRX$ ([angles in] same segment) oe	**2**	**B1** for one of these or 2 pairs of angles identified as equal
(ii)	7.5	**2**	**M1** for $\frac{8}{12}=\frac{5}{x}$ or better
(iii)	$\frac{64}{144}$ oe	**1**	0.444(4...)

9 (a) (i)	23	**1**	
(ii)	17	**1**	
(iii)	10	**1**	
(b)	[14] 16 [28] 42 60	**3**	**B1** for each
(c)	Bar heights 1.4, 3.2, 5.6, 8.4, 6 Bar widths correct with no gaps	**2FT** **1**	**FT** *their* frequencies **B1** for 2 correct independent
10(a) (i)		**2**	Correct curve **B1** correct shape
(ii)	$y = -3$	**1**	
(b) (i)		**3**	**B1** for each branch
(ii)	$x = \pm 3$	**2**	**B1** for each
(c)	–2.38 or –2.384 to –2.385 0.515 or 0.5154 ...	**1** **1**	

11(a)	53 000 42 400	**2**	**B1** for each or **M1** for 95 400 ÷ 9
(b) (i)	5 : 4 cao	**1**	
(ii)	90 000	**3**	**M2** for 95 400 ÷ 1.06 oe or **M1** for 95 400 = 106%
(c)	5300	**3**	**M1 FT** for $\frac{53000+x}{42400+x}=\frac{11}{9}$ oe **M1 FT** for $9(53\,000+x)=11(42\,400+x)$ oe
(d)	Decrease 0.64%	**3**	**B2** for figs 9936 oe **M1** for [×] 1.08 × 0.92 oe
12(a)	$25^2=35^2+x^2-2\times35\times x\times\cos20$ Isolating x terms Completion with no errors	**1** **M1FT** **A1**	**FT** from reasonable attempt at cosine rule
(b) (i)	sketch of parabola, positive x^2, two positive zeros	**M1**	or $\frac{65.78\pm\sqrt{\left[(-65.78)^2-4(1)(600)\right]}}{2(1)}$
	10.94 54.84	**B1** **B1**	**SC1** for 10.9 and 54.8
(ii)	54.84	**1FT**	**FT** *their* larger solution to **(b)(i)**
(c)	1 hour 28 mins	**3**	**M1** for (*their* (54.84 – 10.94)) ÷ 30 **A1 FT** for 1.46[3...] If 0, **B1** for decimal in hours converted into hours and minutes

13(a)	42	**1**	
(b)	$3x + 7$	**2**	**B1** for $3(x + 3) - 2$
(c)	$\frac{x+2}{3}$ oe	**2**	**B1** for $y + 2 = 3x$ or $\frac{y}{3} = x - \frac{2}{3}$ or $x = 3y - 2$ or inverse flow diagram
(d)	$\frac{1}{2x+1}$ final answer	**3**	**B2** for h(x) = $(2x + 1)(x + 3)$ or **SC1** for h(x) = $(2x + a)(x + b)$ where $ab = 3$ or $a + 2b = 7$ with a, b integers