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

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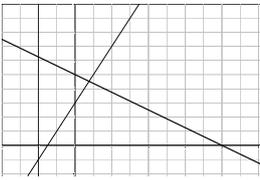
Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

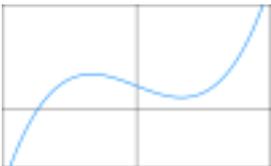Cambridge will not enter into discussions about these mark schemes.

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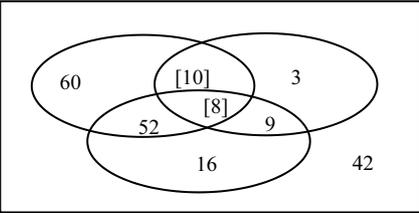
1 (a)	$x = -2$ drawn and ruled $y = 2x + 3$ drawn and ruled Correct region clearly indicated 	1 2 1	**B1** for ruled line with positive gradient through $(0, 3)$ or ruled line gradient 2 or correct line freehand
(b)	4.52	3	**B2** if given in co-ordinates or **M1** for substituting $y = 2x + 3$ in $5x + 8y = 40$ or y coefficients correctly eliminated **A1** for $x = 0.7619$ to 0.762 or **M2** for x coefficients correctly eliminated or **M1** for $y = \dfrac{40 - 5x}{8}$ oe **SC2** for $\dfrac{95}{21}$ 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)	$\cos[\theta] = \dfrac{0.7}{0.9}$ oe $\times 2$ 77.85 to 77.89	**M1** **M1** **A1**	or **M2** for $\cos[\theta] = \dfrac{0.9^2 + 0.9^2 - \left(their\ AB\right)^2}{2 \times 0.9 \times 0.9}$ or **M1** for *their* $AB^2 = 0.9^2 + 0.9^2 - 2 \times 0.9 \times 0.9 \times \cos\theta$	
(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)	$-\dfrac{2}{3}\mathbf{a} + \dfrac{1}{3}\mathbf{b}$ oe	**2**	**B1** unsimplified	
(b)	Correct route for *EB* Completion to $-\dfrac{2}{3}\mathbf{a} + \dfrac{1}{3}\mathbf{b}$	**M1** **A1**		
(c) (i)	*AD* = *EB* *AD* // *EB*	**1**	Accept in words Not $\overrightarrow{AD} = \overrightarrow{EB}$	
(ii)	Parallelogram	**1**		

7 (a)

60   [10]   3

52   [8]   9

16   42

3   **B2** for 4 correct
or **B1** for 2 correct

(b) (i) $\dfrac{42}{200}$ oe   **1FT**   FT *their* 42

(ii) $\dfrac{9}{200}$ oe   **1FT**   FT *their* 9

(c) (i) $\dfrac{870}{39800}$ oe   **2**   **M1** for $\dfrac{30}{200} \times \dfrac{29}{199}$ oe

(ii) $\dfrac{1920}{39800}$ oe   **3**   **M2 FT** for $\dfrac{60}{200} \times \dfrac{16}{199} + \dfrac{16}{200} \times \dfrac{60}{199}$ 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 $\dfrac{8}{12} = \dfrac{5}{x}$ or better

(iii) $\dfrac{64}{144}$ oe   **1**   0.444(4...)

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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	
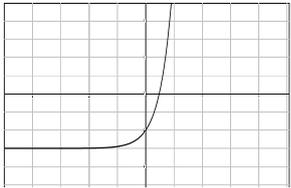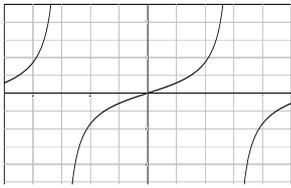
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11(a)	53 000 42 400	2	**B1** for each or **M1** for $95\,400 \div 9$
(b) (i)	5 : 4 cao	1	
(ii)	90 000	3	**M2** for $95\,400 \div 1.06$ oe or **M1** for $95\,400 = 106\%$
(c)	5300	3	**M1 FT** for $\dfrac{53000 + x}{42400 + x} = \dfrac{11}{9}$ oe **M1 FT** for $9(53\,000 + x) = 11(42\,400 + x)$ oe
(d)	Decrease 0.64%	3	**B2** for figs 9936 oe **M1** for $[\times]$ 1.08×0.92 oe

12(a)	$25^2 = 35^2 + x^2 - 2 \times 35 \times x \times \cos 20$ 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 $\dfrac{65.78 \pm \sqrt{\left[(-65.78)^2 - 4(1)(600) \right]}}{2(1)}$
	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)) $\div$ 30 **A1 FT** for 1.46[3...] If 0, **B1** for decimal in hours converted into hours and minutes

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13(a)	42	1	
(b)	$3x + 7$	2	**B1** for $3(x + 3) - 2$
(c)	$\dfrac{x+2}{3}$ oe	2	**B1** for $y + 2 = 3x$ or $\dfrac{y}{3} = x - \dfrac{2}{3}$ or $x = 3y - 2$ or inverse flow diagram
(d)	$\dfrac{1}{2x+1}$ 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