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.

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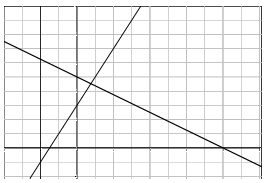
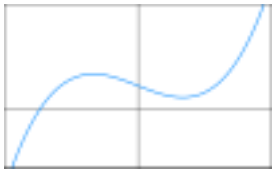
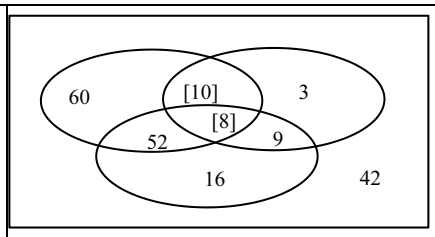
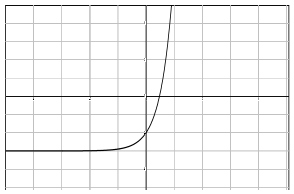
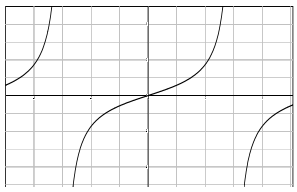
CAMBRIDGE
International Examinations

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