

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

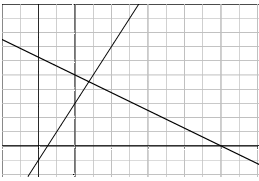
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

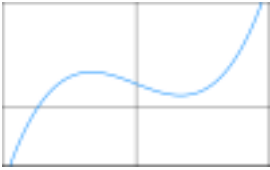
Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

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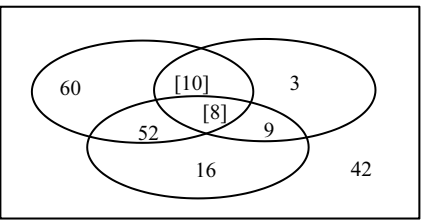
<p>1 (a)</p> <p>$x = -2$ drawn and ruled $y = 2x + 3$ drawn and ruled</p> <p>Correct region clearly indicated</p>  <p>(b)</p> <p>4.52</p>	<p>1 2 1</p> <p>3</p>	<p>B1 for ruled line with positive gradient through (0, 3) or ruled line gradient 2 or correct line freehand</p> <p>B2 if given in co-ordinates 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</p>
<p>2 (a)</p> <p>Plotting 4 points correctly</p> <p>(b)</p> <p>Negative</p> <p>(c)</p> <p>$[y =] -0.429x + 72.2$</p> <p>(d) (i)</p> <p>61 [.0...]</p> <p>(ii)</p> <p>Weak correlation oe</p>	<p>2 1 2 1FT 1</p>	<p>B1 for 2 or 3 correct</p> <p>Ignore comment on strength</p> <p>$a = -0.4295$ to -0.4294 $b = 72.17$ to 72.18 B1 for either a or b correct or SC1 for $y = -0.43x + 72$</p> <p>FT <i>their</i> equation. Allow integer.</p> <p>Allow “no correlation” if answer to (b) is no correlation</p>

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3 (a)	 <p>Cubic (positive x^3) with turning points in correct quadrants.</p>	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 $-1.532\dots$ $x > -0.347$ or -0.3473 to -0.3472 , $x < 1.88$ or $1.879\dots$	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 <i>their</i> $2n - 1$ (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 $an^2 + bn + c$, $a \neq 0$

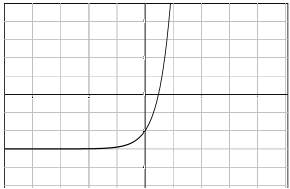
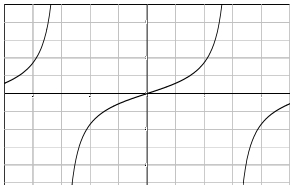
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5 (a)	2.83 or 2.828...	4	M2 for $\sqrt{0.9^2 - 0.7^2}$ or M1 for $x^2 + 0.7^2 = 0.9^2$ or better and M1 FT for <i>their</i> $0.5657 \times 2 \times 2.5$ oe
(b)	$\cos[\theta] = \frac{0.7}{0.9}$ oe $\times 2$ 77.85 to 77.89	M1 M1 A1	or M2 for $\cos[\theta] = \frac{0.9^2 + 0.9^2 - (\text{their } AB)^2}{2 \times 0.9 \times 0.9}$ or M1 for <i>their</i> $AB^2 = 0.9^2 + 0.9^2 - 2 \times 0.9 \times 0.9 \times \cos \theta$
(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 (m^3) $\times 1000$
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 Completion to $-\frac{2}{3}\mathbf{a} + \frac{1}{3}\mathbf{b}$	M1 A1	
(c) (i)	$AD = EB$ $AD \parallel EB$	1	Accept in words Not $\overline{AD} = \overline{EB}$
(ii)	Parallelogram	1	

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

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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 <i>their</i> 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 $\frac{53000 + x}{42400 + x} = \frac{11}{9}$ 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 $[\times] 1.08 \times 0.92$ 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 $\frac{65.78 \pm \sqrt{(-65.78)^2 - 4(1)(600)}}{2(1)}$
	10.94 54.84	B1 B1	SC1 for 10.9 and 54.8
(ii)	54.84	1FT	FT <i>their</i> larger solution to (b)(i)
(c)	1 hour 28 mins	3	M1 for $(\textit{their} (54.84 - 10.94)) \div 30$ 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)	$\frac{x+2}{3}$ 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