

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2014 series**

**0607 CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/41**

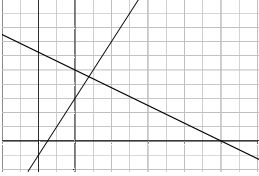
Paper 4 (Extended), maximum raw mark 120

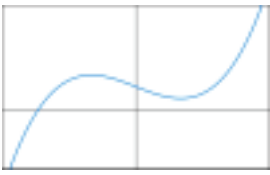
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began,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

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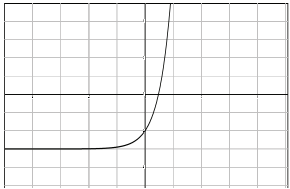
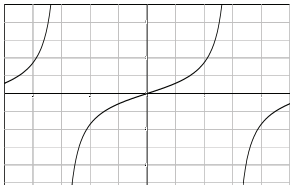
<p><b>1 (a)</b></p> <p><math>x = -2</math> drawn and ruled  <math>y = 2x + 3</math> drawn and ruled</p> <p>Correct region clearly indicated</p>  <p><b>(b)</b></p> <p>4.52</p>		<p><b>1</b>  <b>2</b>  <b>1</b>  <b>3</b></p>	<p><b>B1</b> for ruled line with positive gradient through (0, 3) or ruled line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

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

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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 ( $\text{m}^3$ ) $\times 1000$
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	

7 (a)		3	<b>B2</b> for 4 correct or <b>B1</b> for 2 correct
(b) (i)	$\frac{42}{200}$ oe	1FT	FT <i>their</i> 42
(ii)	$\frac{9}{200}$ oe	1FT	FT <i>their</i> 9
(c) (i)	$\frac{870}{39800}$ oe	2	<b>M1</b> for $\frac{30}{200} \times \frac{29}{199}$ oe
(ii)	$\frac{1920}{39800}$ oe	3	<b>M2 FT</b> for $\frac{60}{200} \times \frac{16}{199} + \frac{16}{200} \times \frac{60}{199}$ oe <b>M1 FT</b> for one of above products
8 (a) (i)	58	1	
(ii)	67	2	<b>B1</b> 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	<b>B1</b> for one of these or 2 pairs of angles identified as equal
(ii)	7.5	2	<b>M1</b> for $\frac{8}{12} = \frac{5}{x}$ or better
(iii)	$\frac{64}{144}$ oe	1	0.444(4...)

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

11(a)	53 000    42 400	2	<b>B1</b> for each or <b>M1</b> for $95\,400 \div 9$
(b) (i)	5 : 4    cao	1	
(ii)	90 000	3	<b>M2</b> for $95\,400 \div 1.06$ oe or <b>M1</b> for $95\,400 = 106\%$
(c)	5300	3	<b>M1 FT</b> for $\frac{53000 + x}{42400 + x} = \frac{11}{9}$ oe <b>M1 FT</b> for $9(53\,000 + x) = 11(42\,400 + x)$ oe
(d)	Decrease 0.64%	3	<b>B2</b> for figs 9936    oe <b>M1</b> 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 <b>M1FT</b> <b>A1</b>	<b>FT</b> from reasonable attempt at cosine rule
(b) (i)	sketch of parabola, positive $x^2$ , two positive zeros	<b>M1</b>	or $\frac{65.78 \pm \sqrt{(-65.78)^2 - 4(1)(600)}}{2(1)}$
	10.94 54.84	<b>B1</b> <b>B1</b>	<b>SC1</b> for 10.9 and 54.8
(ii)	54.84	<b>1FT</b>	<b>FT</b> <i>their</i> larger solution to (b)(i)
(c)	1 hour 28 mins	3	<b>M1</b> for $(\textit{their} (54.84 - 10.94)) \div 30$ <b>A1 FT</b> for 1.46[3...] If 0, <b>B1</b> for decimal in hours converted into hours and minutes

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