

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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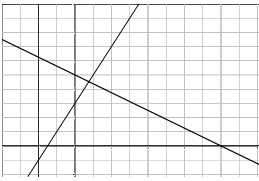
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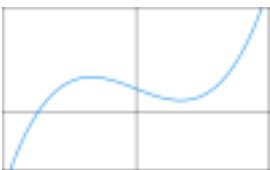
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<p>1 (a)</p> <p>$x = -2$ drawn and ruled $y = 2x + 3$ drawn and ruled</p> <p>Correct region clearly indicated</p>  <p>(b)</p> <p>4.52</p>	<p>1</p> <p>2</p> <p>1</p> <p>3</p>	<p>B1 for ruled line with positive gradient through (0, 3) or ruled line gradient 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</p> <p>1</p> <p>2</p> <p>1FT</p> <p>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>

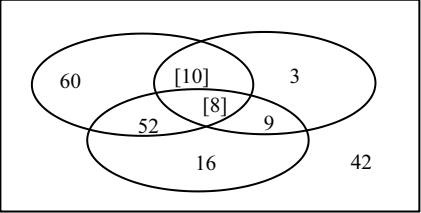
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<p>3 (a)</p>  <p>Cubic (positive x^3) with turning points in correct quadrants.</p> <p>(b) Rotational order 2 about (0, 4)</p> <p>(c) (-1, 6) (1, 2)</p> <p>(d) $x < -1.53$ or $-1.532\dots$ $x > -0.347$ or -0.3473 to -0.3472, $x < 1.88$ or $1.879\dots$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

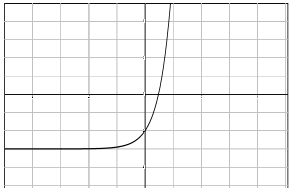
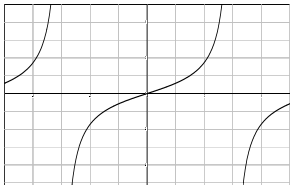
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5 (a)	2.83 or 2.828...	4	M2 for $\sqrt{0.9^2 - 0.7^2}$ or M1 for $x^2 + 0.7^2 = 0.9^2$ or better and M1 FT for <i>their</i> $0.5657 \times 2 \times 2.5$ oe
(b)	$\cos[\theta] = \frac{0.7}{0.9}$ oe $\times 2$ 77.85 to 77.89	M1 M1 A1	or M2 for $\cos[\theta] = \frac{0.9^2 + 0.9^2 - (\text{their } AB)^2}{2 \times 0.9 \times 0.9}$ 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 <i>OAB</i> 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 <i>EB</i> 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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<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>B1 for each</p> <p>FT <i>their</i> frequencies B1 for 2 correct independent</p>
<p>10(a) (i)</p> <p>(ii)</p> <p>(b) (i)</p> <p>(ii)</p> <p>(c)</p>	 <p>$y = -3$</p>  <p>$x = \pm 3$</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 B1 correct shape</p> <p>B1 for each branch</p> <p>B1 for each</p>

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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