

MARK SCHEME for the May/June 2014 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/43

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.

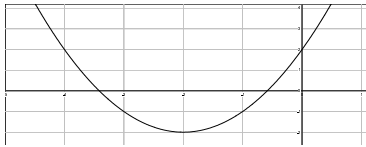
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

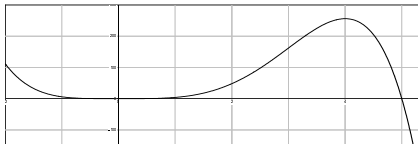
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1	(a)	357 200	3	M1 for $230\,000 \times 1.045^{10}$ oe A1 for 357 000, 357 180, 357 182 to 357 183
	(b)	34	3	M2 for $\log_{1.045}(1\,000\,000/230\,000)$ oe or suitable sketch indicating solution or trial and improvement giving values either side of 1 000 000. or M1 $230\,000 \times 1.045^n = 1\,000\,000$ oe or for suitable sketch but not indicating solution or for trial and improvement by using powers of 1.045 with at least 3 trials greater than 10. SC2 for 33
	(c)	335 or 334.7 to 334.8	3	M2 for $\frac{1\,000\,000 - 230\,000}{230\,000} \times 100$ or $\frac{1\,000\,000}{230\,000} \times 100 - 100$ or M1 for $\frac{1\,000\,000 - 230\,000}{230\,000}$ or $\frac{1\,000\,000}{230\,000} \times 100$ (3.34782...) or (434.782...)
2	(a) (i)	[0]9 10 oe cao	3	M1 for $\frac{30}{40}$ and $\frac{50}{100}$ oe and M1 for 07 55 + <i>their</i> two times
	(ii)	64 cao	2	M1 for $\frac{50 + 30}{\text{their two times added}}$
	(iii)	12.16	2	M1 for $\frac{80}{100} \times 9.5 \times 1.6$ oe
	(b)	65.35	2	M1 for $2 \times 8.80 + 3 \times 5.5 + 5 \times 6.25$
	(c)	22.78	2 FT	M1 for $(2 \times \text{their (a)(iii)} + \text{their (b)} + 24.23) \div 5$ SC1 FT for 20.34 to 20.35

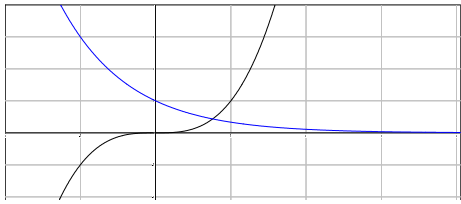
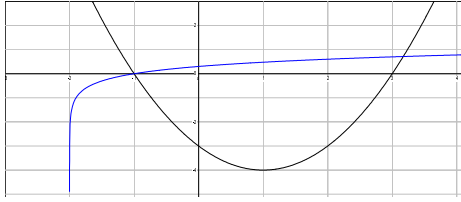
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<p>3 (a) $2 < x \leq 7$</p> <p>(b) $-2 < x < 0, 1 < x < 4$</p> <p>(c)</p>  <p>or $\frac{-4 \pm \sqrt{(4)^2 - 4(1)(2)}}{2(1)}$</p> <p>or $x + 2 = \pm \sqrt{2}$</p> <p>$-3.41,$ -0.59</p>		<p>2</p> <p>3</p> <p>M1</p> <p>B1</p> <p>B1</p>	<p>B1 B1</p> <p>SC2 for inequalities with \leq for $<$. SC1 for either inequality, condoning \leq for $<$ or for the 4 values seen</p> <p>If B0, SC1 for -3.4 and -0.6 or $-3.414\dots$ and -0.586 or -0.5858 to -0.5857</p>
<p>4 (a) (i) $-p + q$</p> <p>(ii) $q + 2p$</p> <p>(b) (i) $(9, 5)$</p> <p>(ii) $x - 3y = -6$ or $-x + 3y = 6$</p>		<p>1</p> <p>1</p> <p>1, 1</p> <p>4</p>	<p>M1 for gradient = $\frac{\text{rise}}{\text{run}} \left(\frac{2}{6} \right)$</p> <p>and M1 for substituting a pair of given co-ordinates into a linear equation. A1 for correct equation in another form seen.</p>
<p>5 (a) 58.5, 44, 72</p> <p>(b) 58.1, 60.3</p> <p>(c) $-0.0214g + 61.5$ $-0.02137\dots, 61.54\dots$</p> <p>(d) (i) 60 or 60.3 to 60.4</p> <p>(ii) No correlation oe</p>		<p>3</p> <p>2</p> <p>2</p> <p>1FT</p> <p>1</p>	<p>SC1 for 0.022 or $0.02217\dots g + 59.04$ to 59.05 or $-0.0214g + k (-0.02137\dots) k \neq 0$ or $kg + 61.5 (61.54\dots) k \neq 0$</p> <p>FT <i>their</i> (c)</p>

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6	(a)		2	B1 for reasonable shape B1 for minimum at (0, 0)
	(b)	0, 5	2	SC1 for (0, 0) and (5, 0)
	(c)	(4, 256)	1	
	(d)	-146 or $-146.2... \leq f(x) \leq 256$	2	B1 for either limit. Condone strict inequalities
	(e)	Any negative integer or integer > 256	1	
7	(a)	145	3	M2 for $(6 \times 180 - 5 \times 129) \div 3$ oe or M1 for sum of interior angles = 6×180 or 135×8 or 1080.
	(b)	18	3	B2 for $2x = 36$ or M1 for $6x + 2 = 2(2x + 19)$ oe
	(c)	14.2 or 14.16 to 14.17	3	M2 for $5.1 \times \left(\frac{5}{3}\right)^2$ oe or M1 for use of $\left(\frac{5}{3}\right)^2$ or $\left(\frac{3}{5}\right)^2$
8	(a) (i)	141 or 141.3 to 141.4	3	M2 for $\frac{40}{360} \times \pi \times 9^2 \times 5$ or M1 for $\frac{40}{360} \times \pi \times 9^2$ 9π or 28.27 to 28.28 or 28.3
	(ii)	178 or 177.9 to 178.0	5	M1 for $\frac{40}{360} \times \pi \times 9^2$ or <i>their</i> area in part (i) and M1 for 5×9 and M2 for $\frac{40}{360} \times \pi \times 18 \times 5$ or M1 for $\frac{40}{360} \times \pi \times 18 (2\pi)$
	(b)	1.44	2	B1 for 1440 or B1FT for <i>their</i> total $\div 1000$

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<p>9 (a)</p>  <p>0.758 or 0.7576 to 0.7577</p> <p>(b)</p>  <p>-1 3.17 or 3.171...</p>		<p>2</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>	<p>B1 graph of $y = x^3$ correct shape oe</p> <p>B1 graph of $y = 3^{-x}$ correct shape oe</p> <p>B1 graph of $y = x^2 - 2x - 3$ correct shape oe</p> <p>B1 graph of $y = \log(x + 2)$ correct shape oe</p> <p>(penalty - 1 if y-coords in answer)</p>
<p>10 (a)</p> <p>63.064...</p> <p>(b)</p> <p>24.1 or 24.07...</p> <p>(c) (i)</p> <p>16[.0] or 16.1 or 16.04 to 16.05...</p> <p>(ii)</p> <p>208 or 209 or 208.0 to 209.3</p> <p>(d) (i)</p> <p>147 or 147.06 to 147.1</p> <p>(ii)</p> <p>327 or 327.06 to 327.1</p>		<p>3</p> <p>3</p> <p>2</p> <p>2</p> <p>1</p> <p>1FT</p>	<p>M2 for $[\cos =] \frac{18^2 + 26^2 - 24^2}{2.18.26} \frac{424}{936} \frac{53}{117}$</p> <p>or M1 for $24^2 = 18^2 + 26^2 - 2.18.26\cos C$</p> <p>M2 for $\frac{18\sin 78}{\sin 47}$</p> <p>or M1 for $\frac{\sin 78}{LV} = \frac{\sin 47}{18}$ oe</p> <p>M1 for $18\sin(63.06)$</p> <p>M1 for $\frac{1}{2} \times 26$ <i>their</i> (c)(i)</p> <p>or $\frac{1}{2} \times 18 \times 26 \sin(63.06)$ oe</p> <p>FT 180 + <i>their</i> part (d)(i) only if answer in range 270 to 360</p>
<p>11 (a)</p> <p>$\frac{7x-5}{(2x-1)(x-2)}$ oe final answer</p> <p>(b)</p> <p>$\frac{x+1}{x+3}$ final answer</p>		<p>3</p> <p>5</p>	<p>B1 for correct denominator</p> <p>B1 for [numerator =] $x - 2 + 3(2x - 1)$ or better</p> <p>B2 for $[x](x-1)(x+1)$ or B1 for $[x](x^2 - 1)$</p> <p>B2 for $[x](x+3)(x-1)$ or SC1 for $[x](x+a)(x+b)$ where $ab = -3$ or $a+b = 2$</p>

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12 (a)	34.4 or 34.41 to 34.42	2	M1 for at least 2 correct mid-values soi.
(b)	Correct histogram	3	B1 for correct column widths and B2 for heights of 0.2, 3.6, 1.4 and 0.3 or B1 for 2 correct heights
13 (a) (i)	$\frac{5}{6}$ oe	1	
(ii)	$\frac{2}{6}$ oe	1	
(b) (i)	$\frac{12}{36}$ oe	2	M1 for $\frac{4}{6} \times \frac{3}{6}$ oe
(ii)	$\frac{30}{36}$ oe	3	M2 for $1 - \frac{2}{6} \times \frac{3}{6}$ or $\frac{4}{6} \times \frac{3}{6} + \frac{2}{6} \times \frac{3}{6} + \frac{4}{6} \times \frac{3}{6}$ oe or M1 for $\frac{2}{6} \times \frac{3}{6}$ with no other products or $\frac{4}{6} \times \frac{3}{6} + \frac{2}{6} \times \frac{3}{6} + \frac{4}{6} \times \frac{3}{6}$ with two products correct
(iii)	$\frac{11}{36}$ oe	2	M1 for $1 - \frac{5}{6} \times \frac{5}{6}$ or $\frac{1}{6} \times \frac{1}{6} + \frac{1}{6} \times \frac{5}{6} + \frac{5}{6} \times \frac{1}{6}$ oe or $\frac{1}{6} + \frac{1}{6} - \frac{1}{6} \times \frac{1}{6}$
14 (a)	23.2 or 23.19 to 23.20	2	M1 for $\tan = \frac{3}{7}$ oe
(b)	14.2 or 14.21... or $\sqrt{202}$	3	M2 for $\sqrt{12^2 + 7^2 + 3^2}$ oe or M1 for a correct Pythagoras statement for one face
(c)	12.2 or 12.18 to 12.20	2FT	FT their (b) M1 for $\sin = \frac{3}{\text{their(b)}}$ oe