Cambridge IGCSE

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CAMBRIDGE INTERNATIONAL MATHEMATICS	**0607/42**
Paper 4 (Extended)	**May/June 2016**
MARK SCHEME	
Maximum Mark: 120	

Published

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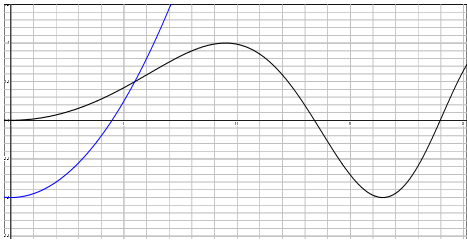
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Abbreviations

awrt   answers which round to
cao   correct answer only
dep   dependent
FT   follow through after error
isw   ignore subsequent working
oe   or equivalent
SC   Special Case
nfww   not from wrong working
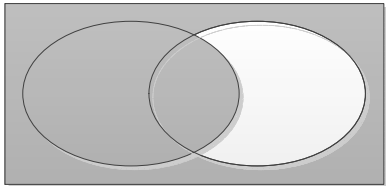soi   seen or implied

Question	Answer	Mark	Part Marks
1 (a)	Image at (5, 5), (7, 5), (6, 6), (5, 6)	2	If 0 scored **SC1** for translation $\begin{pmatrix} 3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 4 \end{pmatrix}$
(b)	Image at (–1, –2), (–1, –4), (–2, –3), (–2, –2)	2	If 0 scored **SC1** for reflection in line $y = x$
(c)	Image at (–2, 5), (–2, 7), (–3, 5), (–3, 6)	3	If 0 scored **SC2** for 90˚ clockwise about (–2, 1) or **SC1** for 90˚ anticlockwise about other centre
(d) (i)	Enlargement [scale factor] 3 [centre] (2, 4)	B1 B1 B1	If combined transformations, all three marks lost
(ii)	Stretch [factor] 2 y-axis oe invariant	B1 B1 B1	If combined transformations, all three marks lost
2 (a)	$\dfrac{630}{9} \times 5$ and $\dfrac{630}{9} \times 4$ oe	M2	**M1** for $630 \div 9$ [=70] or $\dfrac{5 \times 630 \text{ or } 3150}{9}$ or $\dfrac{4 \times 630 \text{ or } 2520}{9}$
(b) (i)	120	3	**M2** for $98.4[0] \div [0].82$ oe or **M1** for recognising 98.4[0] is 82%
(ii)	69.5 or 69.51…	3	**M2** for $\dfrac{98.4[0] - 30}{98.4[0]} \times 100$ oe or **M1** for $\dfrac{98.4[0] - 30}{98.4[0]}$ oe or $\dfrac{30}{98.4[0]} \times 100$ If 0 scored, **SC1** for answer 75%
(iii)	211.6[0] cao final answer	1	

Question	Answer	Mark	Part Marks
(iv)	183	**4**	**B3** for answers 182.8 or 182.84 to 182.85 or **M2** for $150(1.02)^{10}$ seen oe or **M1** for $150(1.02)^n$ seen oe where $n > 1$
(c)	September or October 2035 nfww	**5**	**B4** for 2035 or 19 years and 9 or 10 or 9.96 or 9.961 to 9.962 months nfww or **B3** for 19.8 or 19.83… seen or **M2** for $\dfrac{\log\left(\dfrac{500}{350}\right)}{\log(1.0015)}$ oe or $350 \times 1.0015^n = 500$ **and** at least two valid trials or sketch of appropriate graph or **M1** for $350 \times 1.0015^n \, [= 500]$ or $350 \times \left(1 + \dfrac{0.15}{100}\right)^n [= 500]$ If 0 scored **SC2** for 24[.0] or 23.95 to 23.98 or 2.55 or 2.552 to 2.554… seen
3 (a) (i)	60	**1**	
(ii)	8	**2**	**B1** for [lq =] 56 or [uq =] 64
(iii)	12	**2**	**M1** for 188 seen
(b)	68.6 or 68.57...	**3**	**M2** for $50 \times \dfrac{2.4}{1.75}$ oe or **M1** for *their* distance ÷ 1.75 or **B1** for distance = 120 or for 2.4 and 1.75 or 144 and 105 or 8640 and 6300 seen If 0 scored, **SC1** for 77.2 or 77.24…
4 (a)	24	**3**	**M2** for $6w + 5(w + 30) = 414$ oe or better or **B1** for $6w$ and $5(w + 30)$ oe
(b)	$2x^2 + 4x - 7 \ [= 0]$ oe	**B2**	i.e. a correct simplified quadratic equation **M1** for $x^2 + (x + 1)(x + 3) \ [= 10]$ oe
	Sketch of appropriate graph or correct use of formula or completing square	**M1 dep**	Dep on a quadratic from addition of two areas. Must see some valid method
	4.48 or 4.49	**B2**	**B1** for 4.484 to 4.485… or $6\sqrt{2} - 4$ or 1.12 or 1.121… or $1.5\sqrt{2} - 1$

Question	Answer	Mark	Part Marks
5 **(a)**	Any 2 of the following Angle ADX = Angle BCX and same segment oe Angle DAX = Angle CBX and same segment oe Angle AXD = Angle BXC and vertically opp oe	**2**	**B1** for one of the three pairs or for at least two pairs of angles without reasons or with incorrect reasons
(b)	7.5 oe	**2**	**M1** for $\dfrac{2}{3} = \dfrac{5}{BX}$ oe
(c)	67.2 or 67.20 to 67.21 nfww	**3**	**M2** for $[\cos =]\ \dfrac{2^2 + 5^2 - 4.61^2}{2 \times 2 \times 5}$ or **M1** for $\quad 4.61^2 = 2^2 + 5^2 - 2 \times 2 \times 5\cos(AXD)$
6 **(a)**	Correct sketch 	**2**	**M1** for shape i.e. starting at origin then one maximum then one minimum **A1** for two zeros to right of $x = 10$ and to the left of $x = 20$
(b)	13.4 or 13.41 to 13.42 19[.0] or 18.97…	**1** **1**	
(c)	(9.49, 1) or (9.486 to 9.487, 1)	**B1 B1**	
(d)	(16.4, –1) or (16.43…, –1)	**B1 B1**	
(e)	$-1 \leqslant \mathrm{f}(x) \leqslant 1$	**1**	
(f)	Correct sketch of parabola shape from approximately $y = -1$ 5.48 or 5.477…	**B1** **B1**	
7 **(a)** **(i)**	576 or 575.8 to 576.0…	**3**	**M1** for $\frac{2}{3}\pi \times 5^3$ (262 or 261.7 to 261.8…) **M1** for $\frac{1}{3}\pi \times 5^2 \times 12$ (314 or 314.1 to 314.2)
(ii)	0.547 or 0.5470 to 0.5472	**2FT**	**FT** *their* (a)(i) **M1** for *their* (a)(i) × 0.95 ÷ 1000
(iii)	1827 or 1828	**2FT**	**FT** with consistent units usual accuracy and truncated **M1** for 1000 ÷ *their* (a)(ii)

Question	Answer	Mark	Part Marks
(iv)	361 or 361.2 to 361.3…	4	**M1** for $2\pi \times 5^2$ (157 or 157.0 to 157.1) **M2** for $\pi \times 5 \times \sqrt{5^2 + 12^2}$ (204 or 204.2…) or **M1** for $\sqrt{5^2 + 12^2}$ (13)
(b)	5.37 or 5.369…	5	**M4** for $\sqrt{\dfrac{377}{\pi(1+\sqrt{10})}}$ or **M3** for $\dfrac{377}{\pi(1+\sqrt{10})}$ or **M2** for $\pi r^2 + \pi r\left(\sqrt{(3r)^2 + r^2}\right) = 377$ or **M1** for $r^2 + (3r)^2$ oe
8 (a)	$[a, b, c =]$ –2, 1, 2 $[d =]$ 0	1, 1, 1 1	In any order
(b)	– 1	1	
(c)	– 1	1	
(d)	Parabola vertex downwards and vertex below x-axis Cuts given graph in 5 places	M1 A1	
9 (a)	11	1	
(b)	$\dfrac{7}{23}$ oe	1	
(c)	$\dfrac{110}{182}$ oe	3	**M2** for $\dfrac{their\,(a)}{their\,(a)+3} \times \dfrac{their\,(a)-1}{their\,(a)+2}$ or **M1** for a single product of two fractions with first fraction $\dfrac{their\,(a)}{their\,(a)+3}$
(d)		1	

Question	Answer	Mark	Part Marks
10 (a)	31	2	**B1** for [f(7) =] 12 or **M1** for $2(x^2 - x - 30) + 7$
(b)	$\dfrac{x-7}{2}$ oe	2	**M1** for $y - 7 = 2x$ or $x = 2y + 7$ or $\dfrac{y}{2} = x + \dfrac{7}{2}$
(c)	$(2x+13)(2x+1)$ final answer	3	**B2** for $(2x + 7 + 6)(2x + 7 - 6)$ or for $4x^2 + 28x + 13$ or **M1** for $(2x+7)^2 - 36$
(d)	$\dfrac{x+5}{x+6}$ final answer nfww	4	**B2** for $(x - 6)(x + 5)$ or **SC1** for $(x + a)(x + b)$ where $\quad\quad\quad\quad ab = -30$ or $a + b = -1$ and **B1** for $(x + 6)(x - 6)$
11 (a)	5.4[0] or 5.396…	2	**M1** for $\tan 34 = \dfrac{AB}{8}$ oe or better
(b)	20.4 or 20.38… nfww	5	**B1** for angle D = 146 **M2** for $[\sin C =]$ $\dfrac{8\sin(theirD)}{19}$ or **M1** for $\dfrac{8}{\sin C} = \dfrac{19}{\sin(theirD)}$ oe **A1** for [angle C =] 13.6 or 13.61 to 13.63 OR **B1** for angle A = 56 **M2** for $[\sin C =]$ $\dfrac{their\ AB \times \sin(theirA)}{19}$ or **M1** for $\dfrac{their\ AB}{\sin C} = \dfrac{19}{\sin(theirA)}$ oe **A1** for [angle C =] 13.6 or 13.61 to 13.63
(c)	48[.0] or 48.1 or 48.04 to 48.12 cao	2	**M1** for $0.5 \times their\text{(a)} \times 19 \times \sin(90 + their\text{(b)})$ oe
12 (a)	n^3 cao	1	
(b) (i)	392	2	**B1** for second differences 14, 20, 26 and 32
(ii)	$n^3 + n^2$ oe	2	**M1** for cubic expression but not n^3 or kn^3 only