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Paper 3 (Core) **May/June 2017**

MARK SCHEME

Maximum Mark: 96

Published

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MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

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

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Question	Answer	Marks	Part Marks
1(a)	Accept any two from: whole [number], prime [number], odd, integer, real [number], natural [number], rational [number], positive [number]	**2**	**B1** for one correct
1(b)(i)	Any multiple of 7	**1**	
1(b)(ii)	$\frac{7}{100}$	**1**	
1(b)(iii)	399	**1**	
1(c)(i)	0.14	**2**	**B1** for 0.143 or 0.1428 to 0.1429
1(c)(ii)	2.65	**2**	**B1** for 2.645 to 2.646
1(c)(iii)	8.24×10^5 or $8.235\ldots \times 10^5$	**2**	**B1** for 823543 soi
2(a)	100	**1**	
2(b)	27	**1**	
2(c)	$\frac{9}{20}$	**2**	**FT** $\frac{45}{their\,(a)}$ correctly cancelled **B1FT** for $\frac{45}{100}$ or $\frac{45}{their\,(a)}$
2(d)	Bars with heights at 45 and 18	**2**	**B1** for one bar correct height
3(a)(i)	94.5[0]	**1**	
3(a)(ii)	90	**1**	
3(a)(iii)	The Valley, 4.5[0]	**1**	**FT** *their* (a)(i) and (a)(ii)
3(b)	14	**3**	**M1** for 200 ÷ 13.50 soi **A1** for 14.8…
4(a)	29	**1**	
4(b)(i)	Equilateral	**1**	
4(b)(ii)	60	**2**	**M1** for 180÷3
4(b)(iii)	3	**1**	
4(c)	78	**2**	**M1** for (180 – 24) ÷ 2 soi
5(a)	x^{11}	**1**	
5(b)	x^8	**1**	
5(c)	x^{18}	**1**	

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Question	Answer	Marks	Part Marks
6(a)(i)	Correct diagram	**1**	
6(a)(ii)	12	**1**	
6(b)	8, 16, 32	**2**	**B1** for two values
	Multiply by 2 oe	**1**	
	7, 11, 16	**2**	**B1** for two values
	+1, +2, +3 oe	**1**	
7(a)	14	**4**	**M3** for $27.5 \times 15 \times 4 - 16 \times 16 \times 6.5$ oe or **M1** for $27.5 \times 15 \times 4$ or $16 \times 16 \times 6.5$ oe **A1** for $A = 1650$ **A1** for $B = 1664$
7(b)	Area of 6 faces of B	**M2**	**M1** for area of 3 faces of B
	$B = 928$	**A1**	
	$\frac{their\ B}{1165}$ [×100]	**M1**	
	79.6 to 79.7	**A1**	
8(a)	7	**2**	**M1** for $5 \times 3 - 4 \times 2$ or **B1** for 15 or –8 seen
8(b)	$3x(x - 3)$	**2**	**B1** for $3(x^2 - 3x)$ or $x(3x - 9)$
8(c)(i)	2	**2**	**M1** for $4x = 13 - 5$ oe
8(c)(ii)	9	**2**	**M1** for $3x - 12 = 15$ or $x - 4 = 5$
8(d)	$\frac{F - B}{2}$ oe final answer	**2**	**M1** for $F - B = 2A$ or $\frac{F}{2} = A + \frac{B}{2}$ seen If 0 scored **SC1** for answer $\frac{F}{2}$ – B or $F - B \div 2$
9(a)	Rotation 90 [anti-clockwise] or 270 clockwise [About] (0, 0) or Origin	**3**	**B1** for each
9(b)	Correct translation	**2**	**M1** for translation $\begin{pmatrix} k \\ 1 \end{pmatrix}$ or $\begin{pmatrix} 4 \\ k \end{pmatrix}$
9(c)	Correct reflection	**2**	**M1** for correct reflection in any vertical line

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Question	Answer	Marks	Part Marks
10(a)	4 points correctly plotted	**2**	**B1** for 2 or 3 points correctly plotted
10(b)	Negative	**1**	
10(c)(i)	6	**1**	
10(c)(ii)	5.5	**1**	
10(d)	Ruled line of best fit through *their* mean point and within tolerance	**2**	**M1** for ruled line within tolerance not through *their* mean point or for ruled line with negative gradient through *their* mean point
10(e)	9	**1**	**FT** *their* line with negative gradient
10(f)(i)	21 to 40	**1**	
10(f)(ii)	Largest 100	**1**	
	Smallest 61	**1**	
11(a)	14	**2**	**M1** for 7 ÷ 30 or 30 ÷ 60
11(b)	46	**2**	**M1** for 50 × 0.08 oe or for 0.92 oe seen
11(c)	176	**2**	**M1** for 208 ÷ (11 + 2) soi by 16
12(a)	38.3 or 38.29 to 38.30	**4**	**B1** for 139 **B2** for 100.7… or **M1** for $85^2 + 54^2$
12(b)	32.4 or 32.42 to 32.43	**2**	**M1** for tan [...] = $\frac{54}{85}$ oe **FT** *their AB* if using sine or cosine
13(a)	Correct sketch	**2**	**B1** for correct shape, wrong position
13(b)	Correct sketch	**2**	**B1** for correct shape but touching axes and/or with branches connected
13(c)	1.83 or 1.826 to 1.827	**1**	
	–0.442 or –0.4415 to –0.4419	**1**	If 0 scored **SC1** for 1.8 and 0.44

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