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Paper 3 (Core)

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MARK SCHEME

Maximum Mark: 96

Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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

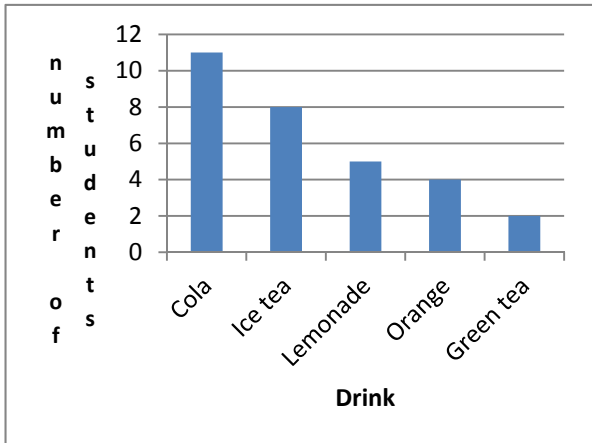
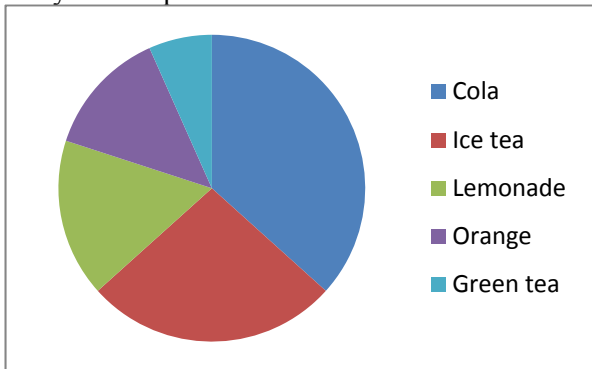
- M Method marks, awarded for a valid method applied to the problem.
- A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.
- B Mark for a correct result or statement independent of 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.

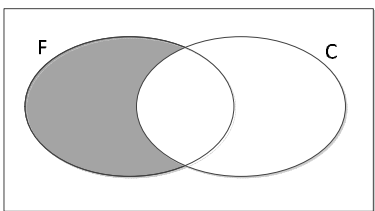
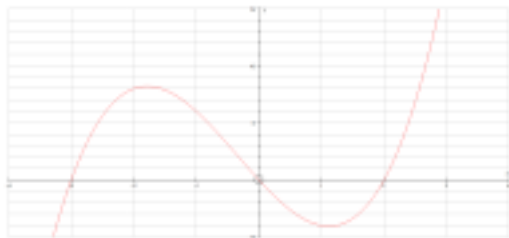
Abbreviations

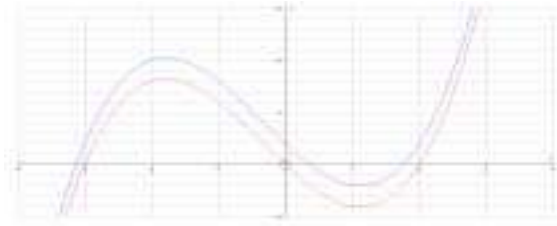
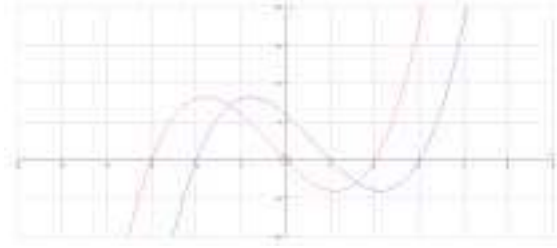
awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

Question	Answer	Marks	Part Marks
1(a)(i)	4[.00]	1	
1(a)(ii)	1[.00]	1	FT 5 – <i>their</i> 4
1(a)(iii)	8[.00]	2	B1 for 10 soi or for 3 bars = 1.6[0]
1(a)(iv)	6	2	M1 for dividing by (3 + 2) soi
1(b)	$6p + 2s = 4.2[0]$ oe	M1	
	$p = [0].5[0]$	A1	
	$3 \times \text{their } p + 1s = 2.1[0]$ oe	M1	
	$s = [0].6[0]$	A1	If zero scored, SC1 for correct answers with no working
2(a)(i)	3 002 001	1	
2(a)(ii)	–2	1	
2(a)(iii)	11.2	1	
2(b)	[1], 2, 4, 5, 10,[20]	2	B1 for 2 correct values
2(c)(i)	70.516	1	
2(c)(ii)	70.52	1	FT <i>their</i> (c)(i) rounded to 2dp
2(c)(iii)	71	1	FT <i>their</i> (c)(i) rounded to 2sf
3(a)	$3a + 11b$ final answer	2	B1 for $11b$ or $3a$ seen
3(b)(i)	–8	2	B1 for –18 or 10 seen or M1 for $6(-3) + 2$ (5)
3(b)(ii)	3	2	M1 for $26 = 6M + 2 \times 4$ oe
3(c)	–5	2	M1 for a correct first step
3(d)	$3a(a - 4b)$ final answer	2	M1 for $3(a^2 - 4ab)$ or $a(3a - 12b)$
3(e)	$8x^5y^3$ final answer	2	B1 for $8x^ky^3$ or $8x^5y^k$ or kx^5y^3
4(a)	4 correct points plotted	2	B1 for 2 points correctly plotted
4(b)(i)	169.375	1	
4(b)(ii)	67.5	1	
4(c)(i)	Correct point plotted	1	FT <i>their</i> (b)

Question	Answer	Marks	Part Marks
4(c)(ii)	Ruled line through <i>their</i> plotted mean point with positive gradient within tolerance	2	B1 for ruled line through <i>their</i> plotted mean point with positive gradient but not within tolerance or for ruled line within tolerance but not through <i>their</i> plotted mean point
4(c)(iii)	66 to 76	1	
5(a)	Correct bar chart 	2	B1 for 2 bars correct or for all heights correct but different widths.
5(b)(i)	$\frac{8}{30}$ oe	1	
5(b)(ii)	$\frac{6}{30}$ oe	1	
5(b)(iii)	0 oe	1	
5(c)	Fully correct pie chart with labels 	3	B2 for correct sectors without labels or 1 correct sector with label or B1 for 1 correct sector without label or B1 for labelled diagram with sectors in the correct order of size or M1 for 1 angle correctly calculated
6(a)	180	2	B1 for $\frac{35}{60}$ oe or $\frac{105}{35}$ soi
6(b)	1 hour 15 minutes	2	M1 for $\frac{105}{84}$ oe soi

Question	Answer	Marks	Part Marks
7(a)	<div style="display: inline-block; vertical-align: top; margin-right: 10px;"> [1] [2] [3] [4] </div> <div style="display: inline-block; vertical-align: top;"> [2] 5 6 6 8 8 1 3 3 3 3 6 2 3 4 5 7 1 1 2 6 7 8 </div>	2	B1 for correct table but 1 or 2 errors or for values correct but unordered
	E.g. $1 \mid 2 = 12$ [steps]	1	
7(b)(i)	23	1	
7(b)(ii)	26	1	
7(b)(iii)	23	2	B1 for 41 or 18
7(b)(iv)	29.1 or 29.13...	1	
8(a)	0.215	1	
8(b)	$\frac{43}{200}$ $\frac{13}{50}$ $\frac{11}{40}$ $1\frac{1}{4}$ oe	1	
8(c)	26	1	
8(d)	27.5	1	
8(e)(i)	$\frac{19}{40}$ oe	1	
8(e)(ii)	$\frac{55}{52}$ oe	1	
8(e)(iii)	$\frac{43}{160}$ oe	1	
9(a)	132	1	
	149	1	FT <i>their</i> 132 + 17
9(b)	$47 + 17n$ oe	2	B1 for 47 or $17n$
10(a)	U <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> </div>	2	B1 for 1 number correct
10(b)	13	1	FT <i>their</i> Venn diagram

Question	Answer	Marks	Part Marks
10(c)	U 	1	
10(d)	$\frac{9}{30}$ oe	1	FT <i>their</i> Venn diagram
11(a)	Correct diagram with vertices at $(-1, 3), (-1, 1), (-4, 1), (-4, 3)$	1	
11(b)	Correct diagram with vertices at $(1, -1), (3, -1), (3, -4), (1, -4)$	2	B1 for correct 90° anticlockwise rotation about origin or for correct orientation, wrong position
11(c)	Correct diagram with vertices at $(-5, -2), (-5, -4), (-2, -2), (-2, -4)$	2	B1 for translation $\begin{pmatrix} -6 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -5 \end{pmatrix}$ or SC1 for translation $\begin{pmatrix} -5 \\ -6 \end{pmatrix}$
12(a)	18.8 to 18.9	3	B2 for answer 11.78 to 11.8 or M2 for $2 \times \pi \times 1.5 \times 0.5 + 2 \times \pi \times 1.5^2$ seen or M1 for $2 \times \pi \times 1.5 \times 0.5$ or $[2 \times] \pi \times 1.5^2$
12(b)(i)	53[.0] or 53.01 to 53.02	2	M1 for $\pi \times 1.5^2 \times 0.5 [\times 15]$
12(b)(ii)	2.4	3	B2 for 2.37... or M1 for <i>their</i> $53.0 = \pi \times r^2 \times 3$ oe soi
13(a)	Correct sketch 	2	B1 for maximum and minimum in correct quadrants.
13(b)	(0, 0)	1	
13(c)	$(-3, 0), (0, 0), (2, 0)$	2	B1 for 2 correct
13(d)	(1.12, -4.06)	2	B1 for each value or SC1 for (1.1, -4.1)

Question	Answer	Marks	Part Marks
13(e)(i)	Correct sketch 	1	FT <i>their</i> (a)
13(e)(ii)	Correct sketch 	1	FT <i>their</i> (a)