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MATHEMATICS

0580/32

Paper 3 (Core)

May/June 2016

MARK SCHEME

Maximum Mark: 104

Published

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Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfw	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
1 (a) (i)	Frequencies 4, 7, 3, 5, 1	2	B1 for 3 or 4 correct in frequency column or for fully correct tally in tally column or for 4, 7, 3, 5, 1 in tally column
(ii)	Correct bar chart	3FT	B1 for linear vertical scale B2FT for all bars correct height and equal width, with equal gaps or no gaps or B1FT for all bars correct height with unequal widths and/or gaps or at least four bars correct height and equal width, with equal gaps or no gaps
(iii)	3	1	
(b)	$\frac{11}{20}$ final answer	2	M1 for $\frac{550}{1000}$ oe seen
(c)	Three correct evaluated, to at least 3 significant figures, consistent divisions	M2	M2 implied by 2.67 or 2.66... and 2.52 and 2.59... or M1 for one correct evaluated division soi, implied by one of 2.67 or 2.66..., 2.52, 2.59... [\$/litre] or one of $2.40/0.9 = 2.7$, $3.15/1.25 = 2.5$, $3.50/1.35 = 2.6$
	1.25 litre bottle indicated	A1	Dependent on M2
(d)	145 155	1, 1	B1 for both correct in reverse order
2 (a) (i)	21 or 28	1	
(ii)	16 or 81	1	
(iii)	27	1	
(iv)	17 or 61 or 67 or 71	1	
(b)	$\sqrt{2}$ and π	1	
(c)	$7 \times (5 - 2 + 3) = 42$	1	

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Question	Answer	Mark	Part marks
(d) (i)	0.9 or $\frac{9}{10}$	1	
(ii)	625	1	
(iii)	0.0625 or $\frac{1}{16}$	1	
(e) (i)	$2^2 \times 3 \times 5$ or $2 \times 2 \times 3 \times 5$	2	B1 for prime factors 2, 3 and 5 (and no others) identified or a correct product eg 6×10 , 4×15 , 5×12 , $4 \times 3 \times 5$ etc
(ii)	180	2	M1 for $2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2 [= 36]$ or B1 for any other multiple of 180 or for listing at least 5 multiples of each with maximum one error
3 (a) (i)	11 04	1	
(ii)	11 50	1FT	
(iii)	38	1	
(b)	4.5	1	
(c) (i)	2.2	2	B1 for 11 or 2200 seen
(ii)	150°	1	
(iii)	Correct position	2	B1 for bearing 195° B1 for distance 2.5 cm
(iv)	3770 or 3769.9 to 3770.4	4	B2 for diameter 1200 [metres] soi or B1 for diameter 6 [cm] soi M1 for $\pi \times \text{their diameter}$ soi
4 (a) (i)	18	2	M1 for $4 \times 3 \times 1.5$
(ii)	Correct net	3	B2 for 6 rectangles correctly positioned to form net of cuboid or B1 for two 4 cm by 3 cm rectangles, two 4 cm by 1.5 cm rectangles and two 3 cm by 1.5 cm rectangles seen
(b) (i)	$16x + 8$ or $8(2x + 1)$	2	M1 for $2(5x + 4 + 3x)$ oe or $16x + k$ as answer or for $3x + 4$ or $2x - 1$ seen

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Question	Answer	Mark	Part marks
(ii)	4	2FT	M1FT for <i>their</i> (b)(i) = 72 if <i>their</i> (b)(i) is linear
(iii)	176	3	M2FT for $(5x + 4) \times (x + 1) + (2x - 1) \times (2x)$ or better soi or $(2x) \times (3x) + (3x + 4) \times (x + 1)$ or better soi or $(5x + 4) \times (3x) - (3x + 4) \times (2x - 1)$ or better soi or M1FT for two sides length from ($5x + 4$, $3x$, $2x$, $x + 1$, $2x - 1$, $3x + 4$) evaluated soi
5 (a) (i)	7.5	2	M1 for $(5+9+12+3+7+4+10+11+5+9) \div 10$ or better
(ii)	4 points correct	2	B1 for 3 correct
(iii)	Positive	1	
(iv)	Ruled line of best fit	1	
(v)	84 to 96	1FT	FT their positive line of best fit
(vi)	(Point) below /lower than/right of/under line (of best fit)	1	
(b) (i)	5 : 3 : 2	2	M1 for 75 : 45 : 30 or better
(ii)	2244	2	M1 for $[2550 \times] 0.88$ oe
(iii)	495	3	M2 for $36 \times 120 + 0.15 \times 4500$ soi or M1 for 36×120 or 0.15×4500 soi
6 (a) (i)	Ruled continuous line $y = 3$	1	
(ii)	Ruled continuous line $x = 1$	2	B1 for (1, -4) plotted or B1 for any line perpendicular to <i>their</i> $y = 3$ drawn
(b)	-8, 4, 4, -8	2	B1 for 3 correct
(c)	Completely correct curve	4	B3FT for 7 or 8 points correctly plotted B2FT for 5 or 6 points correctly plotted B1FT for 3 or 4 points correctly plotted
(d)	(-1.5, 4.1 to 4.4)	1	
(e)	-2.5 to -2.7 and -0.3 to -0.5	2FT	FT intersection of <i>their</i> (a)(i) with <i>their</i> curve B1FT for one correct

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Question	Answer	Mark	Part marks
7 (a) (i)	25	1	
	(ii) 57	1	
	(b) $[\angle BCA =] 180 - 49 - 41 = 90^\circ$	B1	
	Angle [in a] semicircle	B1	
	(c) 14.6 or 14.58...	2	M1 for $\cos 35 = \frac{PR}{17.8}$ or better
(d)	19.3 or 19.31...	3	M2 for $[KL =] \sqrt{28.9^2 - 21.5^2}$ or better or M1 for $28.9^2 = KL^2 + 21.5^2$ or better
8 (a) (i)	Correct reflection	2	B1 for reflection in $y = k$
	vertices (4, -5), (5, -5) and (4, -7)		
	(ii) Translation	1	
	$\begin{pmatrix} -7 \\ -5 \end{pmatrix}$	1	
	(iii) Rotation	1	
	90° [anticlockwise] oe	1	
	[centre] (0, 0) oe	1	
(b)	Correct enlargement	2	B1 for correct size and orientation, incorrect position
9 (a) (i)	38	2	M1 for $4 \times 5 - 3 \times -6$ or better or B1 for 20 or 18 or -18 seen
	(ii) $\frac{p+3t}{4}$ oe	2	M1 for $4r = p + 3t$ or $\frac{p}{4} = r - \frac{3t}{4}$
	(b) $9x + 7$ final answer	2	B1 for $12x - 8$ or $-3x + 15$ or $9x$ or $+7$ seen in working
	(c) $4a(3b - 5a)$ final answer	2	M1 for $a(12b - 20a)$ or $4(3ab - 5a^2)$ or $2a(6b - 10a)$ or $2(6ab - 10a^2)$