CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

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0444 MATHEMATICS (US)

0444/43

Paper 4 (Extended), maximum raw mark 130

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Abbrev	iations	Cambridge
cao	correct answer only	Oh:
dep	dependent	1 2
FT	follow through after error	200
isw	ignore subsequent working	-OA
oe	or equivalent	
SC	Special Case	
nfww	not from wrong working	

Abbreviations

not from wrong working nfww

seen or implied soi

			Correct answer	Mark	Part marks
1	(a)	(i)	$\frac{920}{8} \times 7 = 805$ oe	1	$\frac{2990}{26} \times 7 [= 805]$
	((ii)	30.8 or 30.76 to 30.77	2	M1 for $\frac{8}{(11+8+7)}$ [× 100]
	(b)		1211 final answer	5	B4 for 13926.5[0] [area A total sales] or B3 for 11040 [area B] and 10867.50 [area C] or 21907.5 [area B + area C] or B2 for 11040 [area B] or 10867.50 [area C] or M1 for 736 [B tickets] and M1 for 483 [C tickets] After 0 scored SC2 for answer of 1196 or SC1 for 13754 (A total sales)
	(c)		37720	3	M2 for $\frac{35834}{0.95}$ oe or M1 for 35834 associated with 95%
2	(a)	(i)	104 Angle at centre is twice angle at circumference	1 1	Accept double, 2 × but not middle, edge
	((ii)	128 Opposite angle of cyclic quadrilateral oe	1 1	
	(i	iii)	34 Angle between tangent and radius = 90°	1 1	Accept right angle, perpendicular

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		1	8
(b) (i) (ii)	7.65 to 7.651 49.3 or 49.33 to 49.34	3	M2 for $8.9^2 + 7^2 - 2 \times 8.9 \times 7 \times co$ or M1 for correct implicit formula and A1 for 58.5 to 58.6 M2 for $[\sin BEC =] \frac{7 \sin 56}{their (\mathbf{b})(\mathbf{i})}$ oe or M1 for $\frac{\sin 56}{their (\mathbf{b})(\mathbf{i})} = \frac{\sin BEC}{7}$ oe
3 (a) (i)	5.37[1]	2	M1 for $[AD^2 =]2.6^2 + 4.7^2$ oe or better
(ii)	54.1 or 54.11 to 54.12	3	M2 for $tan[BCD =] \frac{4.7}{(17-11-2.6)}$ oe or B1 for 3.4 seen
(iii)	65.8	2	M1 for $\frac{11+17}{2} \times 4.7$ oe
(b)	263.2 or 263	3FT	FT their (a)(iii) × 4 correctly evaluated M2 for their (a)(iii) × $\left(\frac{9.4}{4.7}\right)^2$ oe or M1 for [scale factor =] $\left(\frac{9.4}{4.7}\right)^2$ or $\left(\frac{4.7}{9.4}\right)^2$ soi
4 (a) (i)	$\frac{x^8}{3}$ final answer	1	
(ii)	$15x^7y^3$ final answer	2	M1 for 2 elements correct
(iii)	$16x^8$ final answer	2	M1 for $16x^k$ or kx^8

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	(b)	$\sqrt{([-]7)^2 - 4.3 12}$ or better	B1	or for $\left(x - \frac{7}{6}\right)^2$ Must see $p + \sqrt{q}$ or $p - \sqrt{q}$ or both
		and $p = []7$ and $r = 2(3)$ oe	B1	Must see $\frac{p+\sqrt{q}}{r}$ or $\frac{p-\sqrt{q}}{r}$ or both
				or for $\frac{7}{6}$ + or $-\sqrt{4+\left(\frac{7}{6}\right)^2}$
		3.48, -1.15 cao	B1B1	After B0 , SC1 for answer 3.5 and -1.1 or 3.482 and -1.149 to -1.148 seen or for 3.48, -1.15 seen or for answer -3.48 and 1.15
	(c)	$\frac{x+5}{x^2}$ or $\frac{1}{x} + \frac{5}{x^2}$ final ans nfww	3	B1 for $(x + 5)(x - 5)$ and B1 for $x^2 (x - 5)$
5	(a) (i)	Ariven with comparable form for both shown or difference between the two fractions shown	1	Accept probabilities changed to decimals or percentages (to 2sf or better)
	(ii)	$\frac{6}{15}$ oe	2	M1 for $\frac{3}{5} \times \frac{2}{3}$
	(iii)	$\frac{7}{15}$ oe	3	M2 for $\frac{3}{5} \times \frac{1}{3} + \frac{2}{5} \times \frac{2}{3}$ oe $1 - their$ (b)(i) –
				$\left \frac{2}{5} \times \frac{1}{3}\right $ or
				M1 for $\frac{3}{5} \times \frac{1}{3}$ or $\frac{2}{5} \times \frac{2}{3}$ seen

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	(b) (i)	Completes tree diagram correctly	3	B2 for 5 values correct or B1 for 1 value correct M1 for $\frac{3}{5} \times \frac{6}{7} \times \frac{7}{10}$
				B1 for 1 value correct
	(ii)	$\left[\frac{126}{350} \text{ oe } \left[\frac{9}{25}\right]\right]$	2	M1 for $\frac{3}{5} \times \frac{6}{7} \times \frac{7}{10}$
	(iii)	$\frac{344}{350}$ oe	3	M2 for $1 - their \frac{2}{5} \times their \frac{1}{7} \times their \frac{3}{10}$ oe
				or $\frac{3}{5} + \frac{2}{5} \times \frac{6}{7} + \frac{2}{5} \times \frac{1}{7} \times \frac{7}{10}$
				M1 for their $\frac{2}{5} \times their \frac{1}{7} \times their \frac{3}{10}$ oe
				or identifies the 7 routes or attempt to add 7 probabilities with at least
				$ \begin{vmatrix} 5 \text{ correct} \\ \frac{9}{25} + \frac{27}{175} + \frac{3}{50} + \frac{9}{350} + \frac{6}{25} + \frac{18}{175} + \\ 1 \end{vmatrix} $
				$\frac{1}{25}$ oe
6	(a)	$\frac{1}{2} \times 8 \times 8 \times \sin 56$ oe	M1	or $[\frac{1}{2} \times 2]$ 8sin28 × 8cos28 or $[\frac{1}{2} \times 2] \times$ 7.06 × 3.75
		26.52 to 26.53	A1	
	(b) (i)	72.[0] or 71.87 to 72.0	3	M2 for $\frac{26.5}{(\pi \times 6.5^2)} \times 360$ oe
				or M1 for $\frac{x}{360} \times \pi \times 6.5^2 = 26.5$ or better
	(ii)	21.1 or 21.2 or 21.14 to 21.17	3	M2 for $\frac{their (\mathbf{b})(\mathbf{i})}{360} \times \pi \times 2 \times 6.5 + 2 \times 6.5$ oe
				or M1 for $\frac{\text{their } (\mathbf{b})(\mathbf{i})}{360} \times \pi \times 2 \times 6.5$ oe or
				$\frac{their (\mathbf{a})}{0.5 \times 6.5}$
	(c) (i)	$\begin{vmatrix} \frac{30}{360} \times \pi \times r^2 - \frac{1}{2} \times r^2 \times \sin 30 \text{ oe} \\ \frac{1}{12} \times \pi \times r^2 - \frac{1}{4} \times r^2 \\ \frac{1}{4} r^2 \left(\frac{1}{3} \pi - 1\right) \end{vmatrix}$	M2	M1 for $\frac{30}{360} \times \pi \times r^2$ or $\frac{1}{2} \times r^2 \times \sin 30$
		$\frac{1}{12} \times \pi \times r^2 - \frac{1}{4} \times r^2$	A1	
		$\frac{1}{4}r^2\left(\frac{1}{3}\pi - 1\right)$	A1	Dep on M2 A1 and no errors seen
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(ii)	20.6 or 20.7 or 20.55 to 20.71	3	M2 for $[r^2 =] \frac{5}{\frac{1}{4}(\frac{1}{3}\pi - 1)}$ or M1 for one correct rearrangement step to r from $\frac{1}{4}r^2(\frac{1}{3}\pi - 1) = 5$
			$r = \frac{1}{4} r \left(\frac{\pi}{3} - 1 \right) - 3$
7 (a) (i)	(1, 2)	1+1	
(ii)	y = 3x - 1 cao final answer	3	M1 for gradient = $\frac{84}{31}$ oe
(11)	y 5x reac intar answer		and M1 for substituting (3, 8) or (-1, -4) into their $y = 3x + c$ or for finding y-intercept is -1
(b) (i)	(x+5)(x-2) isw solutions	2	SC1 for $(x + a) (x + b)$ where $ab = -10$ or $a + b = 3$
(ii)	[a =] -5 [b =] 2 [c =] -10	3FT	B1FT for each of <i>their</i> 5 and <i>their</i> -2 from (b)(i) and B1 for $c = -10$
(iii)	x = -1.5	1FT	$\mathbf{FT} \ x = (their \ (a+b))/2$
(c)	Inverted parabola	B1	
	x-axis intercepts at −2 and 9	B2	B1 for each
	y-axis intercept at 18	B1	After B0 allow SC1 for $(9 - x) (2 + x)$ oe
(d) (i)	p = 6 $q = 43$	3	B2 for $(x + 6)^2 - 43$ or $p = 6$ or $q = 43$ or $\mathbf{M1}$ for $(x + 6)^2$ or $x^2 + px + px + p^2$ and $\mathbf{M1}$ for $-7 - (their 6)^2$ or $p^2 - q = -7$ or $2p = 12$
(ii)	-43	1FT	FT – their q
8 (a) (i)	7	4	M2 for $\frac{16 \times 11 + 17 \times 10 + 18p + 19 \times 4 + 20 \times 8}{11 + 10 + 4 + 8 + p} = 17.7$ or better
			or M1 for sum of two products or better or for [total =] $11 + 10 + 4 + 8 + p$ and B1 for $582 + 18p = 17.7 (33 + p)$
(ii)	17	1FT	STRICT FT median for <i>their p</i> if integer

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	(b) (i)	64	2	M1 for $\frac{320}{6.4} \times 1.28$ oe
	(ii)	40	2	M1 for $\frac{320}{480} \times 60$ oe
	(iii)	1.6[0]	2FT	FT their (b)(i) / their (b)(ii) evaluated correctly to 2dp
				M1 for their (b)(i) / their (b)(ii) or $\frac{480}{6.4} \times 1.28 \div 60$
				1.28 ÷ 00
9	(a)	$\begin{pmatrix} -4 \\ 2 \end{pmatrix}$	1	
	(b)	5.83 or 5.830 to 5.831	2	M1 for $\sqrt{5^2 + 3^2}$
	(c) (i)	$\frac{3}{5}$ oe	1	
	(ii)	$y = -\frac{5}{3}x + 2$	2	B1 for $y = -\frac{5}{3}x + b$ $y = mx + 2$
				or M1 for $y = -\frac{1}{their(\mathbf{c})(\mathbf{i})}x + 2$
				SC1 for $-\frac{5}{3}x + 2$
10	(a) (i)	5x + 14 final answer	2	M1 for $5x + k$ or $kx + 14$
	(ii)	14.2	3	M1 for $5x = 32 - 14$ FT <i>their</i> expression in (a)(i) A1FT for $x = 3.6$

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(b)	8a - 3b + 14 = 32.5 or better 5a + 4b + 13.5 = 39.75 or better	B1 B1	8a - 3b = 18.5 5a + 4b = 26.25 or rearranges one of <i>their</i> equations to make a or b the subject $3b + 18.5$
	Equates coefficients of either a or b	M1	or rearranges one of <i>their</i> equations to make <i>a</i> or <i>b</i> the subject
	$ \begin{vmatrix} 40a - 15b = 92.5 \\ 40a + 32b = 210 \end{aligned} $		e.g. $a = \frac{3b + 18.5}{8}$
	or $32a - 12b = 74$ $15a + 12b = 78.75$		
	Adds or subtracts to eliminate $47b = 117.5$ $47a = 152.75$	M1	Dep on previous method or correctly substitutes into the second equation $eg \frac{5(3b+18.5)}{8} + 4b = 26.25$
	[<i>a</i> =] 3.25	A1	After M0 scored, SC1 for 2 correct values with no working
	[b =] 2.5	A1	or for two values that satisfy one of their original equations
(a)	First graph moved one unit to right	1	
	Second graph moved up one unit	1	
	Third graph straight parts moved up to $y = 2$	1	
	Third graph curved part moved so that maximum at (0, 4)	1	
(b)	C	1	
	A	1	
	D	1	
	B	1	