CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the May/June 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/22 Paper 2, maximum raw mark 100

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Qu.	Answers	Mark	Part Marks
1 (a)	$\frac{17x+13}{6}$ cao final answer	2	**M1** for $\frac{2(4x-1)}{6}+\frac{3(3x+5)}{6}$ or better oe
(b) (i)	$\frac{1}{2}$ or 0.5 cao	1	
(ii)	$y = 1$ final answer	1	
(iii)	Line from (6, 1) to (4, 3)	1	
(iv)	$y = -x + 7$ final answer	2	**B1** for any equation with grad –1 and/or intercept 7
(v)	(0, 6)	2	**B1** for line from (2, 2) with y-intercept between 5 and 7 soi Or for correct (unsimplified) equation ($y = -2x + 6$)
2 (a)	27	1	
(b)	Constant speed	1	
(c)	0.08 or $\frac{2}{25}$ final answer	1	
(d)	3 to 3.5	1	
(e)	1500	2	**M1** for $\frac{1}{2}(200+50)12$ Or **B1** for $\Delta = 900$ or rectangle = 600 After **0**, allow **SC1** for 1750
(f)	27 cao	2	**M1** for *their* (total distance ÷ total time) soi
3 (a) (i)	67.8	3	**M1** for 15×10+45×15+75×11+105×7+135×5+165×2 i.e. 150+675+825+735+675+330 (=3390) **B1** for ÷ 50 (independent of **M** mark)
(ii)	$90 \leqslant t < 120$	1	Or clear equivalent
(b) (i)	100 and 76 and 48	2	**B1** for 100 and 76, or for 48
(ii)	Completed pie chart with at least one sector correctly labelled	1	
4 (a) (i)	72	1	
(ii)	83	1	
(iii)	108	1	
(iv)	83	1FT	Their (ii)

	(b) (i)	4 (π) cao	2	**B1** for $\pi \times 6^2$ or for $\frac{40}{360}$
	(ii)	$12 + \frac{4}{3}\pi$ final answer	2	**B1** for (a =) 12, or for (b =) $\frac{4}{3}$
	(iii)	8	1ft	
5	**(a)**	(±) 9.3(0) to 9.31	4	**M2** for $BC^2 = 8^2 + 11^2 - 2 \times 8 \times 11 \cos 56$ Or **M1** for $8^2 + 11^2 \pm (2) \times 8 \times 11 \cos 56$ **B1** for 86.5 to 86.6
	(b)	122.2 to 122.3	3	**M2** for (sin ADC =) $\frac{11\sin 30}{6.5}$, or 57.7 to 57.8, or 58 Or **M1** for $\frac{\sin ADC}{11} = \frac{\sin 30}{6.5}$ oe
	(c)	45.7 to 45.71	4	**B1** for 27.7 to 27.8 seen **M1** for $\frac{1}{2} \times 11 \times 8 \times \sin 56$ (= 36.478...) or for $8 \times \sin 56$ if using heights **M1** for $\frac{\textit{their}\text{ stated area}}{\textit{their}\text{ area}ABC} \times 100$ or $\frac{\textit{their}\text{ height }ADC}{\textit{their}\text{ height }ABC} \times 100$
6	**(a)**	325	2	**M1** for $\frac{250}{20500}$ or $\frac{26650}{20500}$ Or **B1** for 82 seen
	(b)	465 and 2.56 to 2.57	3	**B2** for 465 or 2.56 to 2.57 seen Or **M1** for 400 × 1.17 (468)
	(c)	170	3	**B2** for 420 or 144.5(0) Or **M1** for 357 ÷ 0.85 or 357 – (250 × 0.85)

SECTION B			
Qu.	**Answers**	**Mark**	**Part Marks**
7 (a) (i)	$f^{-1}(x) = \frac{3x-7}{2}$ oe final answer	2	**M1** for $3y = 2x + 7$ or $3x = 2y + 7$ oe
(ii)	$m = -14$	2	**M1** for $\frac{2m+7}{3} = \frac{m}{2}$ oe
(b) (i)	4, 4 and smooth correct graph drawn	3	**B1** for 4 and 4 **B1** for 7 correct plots
(ii)	(y =) 6.2 to 6.4	1	
(iii)	line drawn and $x = -0.7$ to -0.8 $x = 2.7$ to 2.8	2	**M1** for correct line drawn
(iv)	line drawn and $x = -2.3$ to -2.7	2	**M1** for horizontal line crossing curve at intersection of $x = 3.5$ and their curve or for the line $y = -2.75$
8 (a)	321	1	
(b)	9.43 to 9.44	2	**M1** for $\sin 39 = \frac{y}{15}$ oe
(c)	19.3 to 19.31	2	**B1** for $\cos 39 = \frac{15}{x}$ oe
(d) (i)	X marked 12cm from A on bearing of 141^o	2	**B1** for either a correct distance or bearing
(ii)	Correct region shaded	3	**B1** for arc, min length 3 cm, radius 6 cm, centre A **B1** for bisector of $\angle ABC$, min length 3 cm **B1** for shading
(iii)	17.6 to 18.4 dependent on an acceptable X and Y	2	**M1** for Y established at northern end of shading
9 (a) (i)	$2x(2x^2 - 5y)$ final answer	1	
(ii)	$(3a + b)(3a - b)$ final answer	1	
(b)	$m = \frac{5}{8}$, 0.625	2	**M1** for $7 = 12 - 8m$ or $\frac{7}{4} = 3 - 2m$
(c) (i)	$h^2 + (h + 7)^2 = 23^2$ leading to correct rearrangement	2	**M1** for $h^2 + (h + 7)^2 = 23^2$
(ii)	$\frac{h}{2}(h + 7)$ oe isw	1	

(iii)	120 cao	1	
(iv)	12.4, –19.4	3	**B2** for one correct solution, or for 12.38 to 12.40 and –19.38 to –19.40 Or if in form $\frac{p \pm \sqrt{q}}{r}$, **B1** for $p = -7$ and $r = 2$ and **B1** for $q = 1009$ or $\sqrt{q} = 31.7$ to 31.8
(v)	54.76 to 54.8	1FT	
10 (a) (i)	Rotation 90° anticlockwise about (1,1)	2	**B1** for Rotation **B1** for 90° anticlockwise and about (1,1)
(ii)	Correct triangle	2	**B1** for two correct vertices
(iii)	Correct triangle	2	**B1** for two correct vertices
(iv)	24	2	**B1** for 4^2 soi or **M1** for $\frac{1}{2} \times 12 \times 4$
(b)	2	1	
(c)	4	1	
(d)	Rectangle, Rhombus	2	**B1** for one correct
11 (a) (i)	$\frac{7}{30}$ or 0.23… or better	1	
(ii)	$\frac{11}{15}$ cao	1	
(iii) (a)	All probabilities correctly placed	2	**B1** for at least 8 correct
(b)	$\frac{308}{870}$ or $\frac{154}{435}$ or 0.354	2	**M1** for $\left(their\frac{7}{30} \times their\frac{6}{29}\right) + \left(\frac{15}{30} \times their\frac{14}{29}\right)$ $+ \left(\frac{8}{30} \times their\frac{7}{29}\right)$
(b) (i)	Correct histogram	3	**B2** for at least 3 correct bars Or **B1** for at least 1 correct bar or correct frequency densities seen
(ii)	61 or 62	2	**B1** for 6 or 7 seen
(iii)	10	1	