

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

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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 <i>their</i> (total distance \div total time) soi
3 (a) (i)	67.8	3	M1 for $15 \times 10 + 45 \times 15 + 75 \times 11 + 105 \times 7 + 135 \times 5 + 165 \times 2$ i.e. $150 + 675 + 825 + 735 + 675 + 330 (=3390)$ B1 for $\div 50$ (independent of M mark)
(ii)	$90 \leq t < 120$	1	Or clear equivalent
(b) (i)	100 <u>and</u> 76 <u>and</u> 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)

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(b) (i)	$4(\pi) \text{ cm}$	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	1 ft	
5 (a)	$(\pm) 9.3(0) \text{ to } 9.31$	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 $\frac{1}{2} \times 11 \times 8 \times \sin 56 (= 36.478\dots)$ or for $8 \times \sin 56$ if using heights M1 for $\frac{\text{their stated area}}{\text{their area } ABC} \times 100$ or $\frac{\text{their height } ADC}{\text{their height } ABC} \times 100$
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 $357 \div 0.85$ or $357 - (250 \times 0.85)$

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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 <u>and</u> $x = -0.7$ to -0.8 $x = 2.7$ to 2.8	2	M1 for correct line drawn
(iv)	line drawn <u>and</u> $x = -2.3$ 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°	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	

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(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 $\left(\text{their } \frac{7}{30} \times \text{their } \frac{6}{29} \right) + \left(\frac{15}{30} \times \text{their } \frac{14}{29} \right) + \left(\frac{8}{30} \times \text{their } \frac{7}{29} \right)$
(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	