

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/22

Paper 2, maximum raw mark 100

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Question	Answers	Mark	Part Marks
1 (a) (i) (a)	396	2	M1 for $\frac{60}{100} \times 360 + 15 \times 12$ or B1 for $\frac{60}{100} \times 360$ seen
(b)	110 isw	1ft	
(ii)	770	2	M1 for $x - \frac{26}{100}x = 569.80$ oe or B1 for $\div$ by figs 74
(b)	1.21	3	M2 for $\frac{850}{1.87}x = 550$ oe or B1 for $\frac{850}{1.87}$ or $\frac{1.87}{850}$ or $\frac{850}{550}$ or $\frac{550}{850}$ or $\frac{x}{1.87}$ or $\frac{550}{x}$
2 (a)	14	2	M1 for $\frac{1}{2} \times CA \times (11 - 7)$ oe or SC 1 for 28
(b)	10.8	2	M1 for $\sqrt{(8 - (-2))^2 + (7 - 11)^2}$
(c)	22.8	2ft	B1 for $[BC =] 5$ soi or M1 for (b) + their $BC + CA$
(d)	21.8	2ft	M1 for $\tan A = \frac{(11 - 7)}{(8 - (-2))}$ oe
3 (a) (i)	Convincing explanation	1	
(ii)	28	2	B1 for $\widehat{OCD} = 124$ or triangle COD isosceles soi
(iii)	76	1ft	
(b) (i)	Convincing explanation	2	B1 for a correct pair of equal angles stated
(ii)	2.5	3	B1 for $8.5 - SR$ or $8.5 - QS$ seen and M1 for $\frac{12}{5} = \frac{8.5 - SR}{SR}$ or $\frac{12}{5} = \frac{QS}{8.5 - QS}$

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Question	Answers	Mark	Part Marks
4 (a) (i)	2.12	2	M1 for $\frac{1}{2} \times \frac{4}{3} \times \pi \times r^3 = 20$ soi or SC1 for 1.68
(ii)	6.79	2	B1 for $\sqrt[3]{\frac{50}{20}}$ or $\sqrt[3]{\frac{20}{50}}$ oe or M1 for $\left(\frac{5}{x}\right)^3 = \frac{20}{50}$ oe
(b)	187	3	M1 for $\pi(\text{figs } 15)^2$ oe and M1 for $\left[\frac{1}{2} \times \right] 4 \times \pi \times (\text{figs } 55)^2 - 50 \times$ their πr^2
5 (a)	51.2	2	M1 for $AC^2 + 40^2 = 65^2$ oe
(b)	12.7	2	M1 for $\frac{AF}{30} = \sin 25$ oe
(c)	40.4	3	M1 for $\frac{35}{AG} = \cos 30$ oe and a further M1 for $(AG =) \frac{35}{\cos 30}$ oe
6 (a) (i)	-4.62 -2.38 final answer	2	B1 for one value SC1 for both -4.6 and -2.4
(ii)	(B =) 7 (C =) 11	3	M1 for $(x + \frac{7}{2})^2 = \frac{5}{4}$ and B1 for one correct value
(b)	$x < -2$	2	M1 for isolating $3x$ and -6 soi
(c)	$(x + 3y)(6 - t)$ oe	2	M1 for the correct extraction of a common factor at any stage
(d)	$(a =) 17$ $(b =) -16$	4	M1 for equalising one set of coefficients or substitution and a further M1 for eliminating one variable or simplifying an equation in one variable and A1 for 17 and A1 for -16 After A0, SC1 for correct substitution into one of the original equations to find the other variable

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Question	Answers	Mark	Part Marks
7 (a)	Fully shown	2	M1 for the area sine formula
(b)	$2x^2 - 19x + 6 (= 0)$ correctly obtained	3	B1 for both $x + 12$ and $4 + 2x - 5$ and M1 for $\frac{x(2x-5)}{their(x+12)their(4+2x-5)} = \frac{1}{3}$
(c) (i)	9.17 0.33	3	B1 for $\sqrt{(-19)^2 - 4 \times 2 \times 6}$ soi and B1 for $\frac{-(-19) \pm \sqrt{their 313}}{2 \times 2}$ soi and M1 for both real values of $\frac{p \pm \sqrt{q}}{r}$
(ii)	0.33 with reason	1	
(d)	6.35	3ft	M2 for $(BC^2 =)$ $c(i)^2 + (2c(i)-5)^2 - 2 \times c(i) \times (2c(i)-5) \times \cos 25$ or M1 for correct formula with one error and A1 ft for correct evaluation from their M1 SC1 for $x^2 + (2x-5)^2 - 2x(2x-5)\cos 25$ oe
8 (a) (i)	2.62	2	M1 for $\frac{25}{360} \times 2\pi \times 6$
(ii)	7.85	2	M1 for $\frac{25}{360} \times \pi \times 6^2$
(b) (i)	39.3	1ft	
(ii)	88.8	3ft	B1 for 30 or 60 or M1 for $5 \times (a)(i)$ and indep M1 for $2 \times (a)(ii)$
(iii)	471 to 472	2ft	B1 for height = 15 and radius = 12 soi
(c) (i)	$(h =) \frac{800}{\pi r^2}$	1	
(ii)	h is divided by 4 oe	1	

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Question	Answers	Mark	Part Marks
9 (a)	36	1	
(b)	Correct plots ft and curve	2	P1 for 6 correct plots ft
(c) (i)	$4 < \text{gradient} < 6$	2ft	B1 for tangent at $t = 4$
(ii)	Speed oe	1	
(d)	Their 2.5	2ft	B1 for their 1.8 and their 4.3
(e) (i)	Their 1.65 towards Their 4.7 away from	2ft	B1 for one correct ft
(ii)	$t^2 + \frac{48}{t} - 20 = 12$ oe isw	1	
(iii)	–32 cao	1	
10 (a)	Correct histogram	3	If 3 not scored, up to 2 marks from: B1 for correct fd's (allow one error) B1 for correct column widths B1 for correct heights from their fd's
(b)	$95 < t \leq 100$	1	
(c)	98.2	3	M1 for $\sum fx$ B1 for division by 80 seen
(d)	$\frac{28}{80}$ oe	1	
(e) (i)	$\frac{992}{6320}$ oe	2	M1 for $2 \times \frac{32}{80} \times \frac{31}{79}$ or $\frac{32}{80} \times \frac{31}{80}$
(ii)	$\frac{64}{6320}$ oe	2	M1 for $\frac{4}{80} \times \frac{8}{79}$ or $2 \times \frac{4}{80} \times \frac{8}{80}$

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Question	Answers	Mark	Part Marks
11 (a) (i)	6.08	1	
(ii)	$\begin{pmatrix} 1 \\ 4 \end{pmatrix}$	2	M1 for $\overrightarrow{AF} = \overrightarrow{AH} + \overrightarrow{HF}$ oe or B1 for $\frac{1}{2}\begin{pmatrix} 6 \\ 1 \end{pmatrix}$
(iii) (a)	$\begin{pmatrix} 4 \\ -7 \end{pmatrix}$	1	
(b)	$\overrightarrow{GD} = 2\overrightarrow{FH}$ stated or appropriate numerical vector statement	1	dep
(iv)	(9.5, 3)	1ft	
(b) (i)	Correct image	1	
(ii)	Centre (4, 0) oe Scale factor $\times 2$ oe	2	B1 for either
(iii)	(5, 2)	1	
(iv)	Correct image	2	B1 for either Stem of flag R on or parallel to $y = -x$ or Hypotenuse of flag parallel to y -axis. SC1 for correct clockwise rotation