



MATHEMATICS (SYLLABUS D)

4024/12

Paper 1

May/June 2016

MARK SCHEME

Maximum Mark: 80

Published

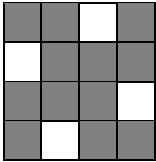
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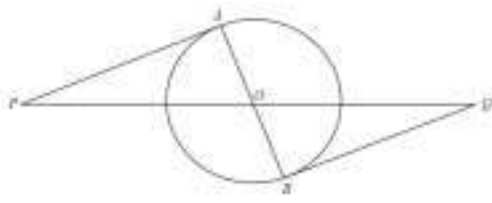
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Question	Answers	Mark	Part marks
1 (a)	0.69	1	
(b)	$\frac{8}{15}$ oe	1	
2 (a)	... 2 ... 2	1	
(b)		1	
3 (a)	Ruled straight line through (0, 0) and (100, 56)	1	
(b)	35 to 37	1	
4	... = 0.15 = 15[%] $\frac{5}{8} = 0.625 = \dots$	2	C1 for two or three correct
5 (a)	9	1	
(b)	-18	1	
6 (a)	$2^5 \times 3$	1*	
(b)	72	1	
7 (a)	1.5 [hours] or 90 [minutes] oe	1	
(b)	20 35	1	
8	7.2 or $\frac{36}{5}$ oe	2*	M1 for $20 = 10^2k$ oe or $\frac{20}{10^2} = \frac{y}{6^2}$ oe
9	16	2*	B1 for 15, 8 and 11 correctly placed and 26 not placed in Venn diagram or for $x + 26 + 8 = 50$ oe or for $50 - 26 - 8$ oe leading to answer
10	$x = 0.5$ oe $y = -2$	2*	C1 for either x or y correct or for two values that fit one equation
11 (a)	$\frac{x^4}{3y^3}$	1	
(b)	$\frac{v^2}{2t}$	1	

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Question	Answers	Mark	Part marks
12 (a) (i) (ii) (b)	arc radius 3.5 cm, centre A	1	
	bisector of angle ACB	1	
	Correct region shaded	1	
13 (a) (b) (i) (ii)	$27^0, \sqrt[3]{1000}, 5^2, 2^5$	1	
	any value in range $4 < x < 9$	1	
	any value in range $-1 < x < 0$	1	
14 (a) (b)	$(-4, 2)$ $(6, 2)$	1	Both correct
	$(-3, -1)$ $(5, 5)$	2	C1 for one correct or for two x -values or two y -values correct or for both $(4, 6)$ and $(-2, -2)$
15 (a) (b)	$x + y \leq 8$ oe $2y \geq x + 4$ oe $x \geq 0$	2	C1 for two correct
	3	1	
16 (a) (b)	595	1	
	340	2*	M1 for 10×25.5 soi
17	280, 295, 310	3*	C2 for two correct values OR B2 for two from $70^\circ, 40^\circ$ and 55° seen OR B1 for 70° seen or for 10° or 120° correctly positioned on diagram
18 (a) (b)	16	1	
	160 or $10 \times$ <i>their</i> (a)	2ft*	M1 for $0.5 \times$ <i>their</i> $v \times (8 + 12)$ oe or $0.5 \times$ <i>their</i> $v \times 4 +$ <i>their</i> $v \times 8$ oe

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Question	Answers	Mark	Part marks
19	$\angle POA = \angle QOB$ vertically opposite $AO = OB$ equal radii $\angle PAO = \angle QBO = 90^\circ$ tangent perpendicular to radius 	3*	B1 for two pairs of equal angles: $\angle POA = \angle QOB$ and $\angle PAO = \angle QBO$ or for one pair of angles and pair of sides: $\angle POA = \angle QOB$ or $\angle PAO = \angle QBO$ and $AO = OB$ AND B1 for a correct reason linked with a correct pair of angles/sides
20 (a)	$\frac{2}{10}, \frac{2}{9}, \frac{8}{9}, \frac{1}{9}$ correctly positioned	1	
(b) (i)	$\frac{56}{90}$ oe	1*	
(ii)	$\frac{32}{90}$ oe	2ft*	M1 for $\frac{8}{10} \times \frac{2}{9} + \frac{2}{10} \times \frac{8}{9}$ ft <i>their</i> tree diagram with fractions < 1
21 (a)	$2x + 3$ oe	1	
(b) (i)	7	1	
(ii)	$\frac{8-2x}{3}$ oe final answer	2*	B1 for $3x = 8 - 2y$ or $3y = 8 - 2x$ or $2x = 8 - 3y$ or $2y = 8 - 3x$ or $1.5x = 4 - y$ or $1.5y = 4 - x$ or $\frac{8-2x}{3}$ oe seen or $\frac{8-2y}{3}$ oe seen
22 (a)	1.8×10^8 cao	2	C1 for $1.7[\dots] \times 10^8$ or answer figs 18
(b)	5	1	
(c)	20 cao	2*	C1 for answer figs 2 or answer 18 OR B1 for 4×10^7 oe and 2×10^6 oe seen
23 (a)	Two correct bars drawn	2	C1 for rectangle base 0 to 10 height 2.8 or for rectangle base 30 to 60 height 0.6
(b)	12	1	
(c)	$\frac{30}{150}$ oe or $\frac{18+m}{138+m}$ oe evaluated	2ft*	B1 FT for fraction with numerator or denominator correct or for answer 20% or 0.2

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24 (a)	320	3*	M2 for $\frac{a}{360} \times \pi \times (3r)^2 = 8\pi r^2$ oe OR M1 for $\frac{a}{360} \times \pi \times (3r)^2$ oe seen or for $8\pi r^2$ seen
(b)	$6r + \frac{16\pi r}{3}$ final answer	2*	C1 for $kr + \frac{16\pi r}{3}$, where $k \geq 0$ OR M1 FT for $\frac{their320}{360} \times 2\pi \times 3r$ oe or for $6r + \frac{their320}{360} \times n\pi r$ oe where n is a positive integer
25 (a) (i)	-6	1	
(ii)	15	2*	C1 for $15^2 - 5 \times 15$ or for 15, -10 OR M1 for $(p + 10)(p - 15) [= 0]$
(b)	4	2*	B1 for $3 \times 5^2 - 5k = 55$ oe
26 (a)	$\frac{3+4t}{t-1}$ oe	3*	C2 for $\frac{7}{t-1}$ or $\frac{3-4t}{t-1}$ OR M1 for $t(p-4) = p+3$ or $pt-4t = p+3$ AND M1 for isolating p terms after fraction eliminated e.g. $pt-p = 3+4t$ or $p(t-1) = 3+4t$
(b)	$\frac{2x-1}{x-5}$ final answer	3*	B1 for $(2x+1)(2x-1)$ seen AND B1 for $(2x+1)(x-5)$ seen