

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**4024 MATHEMATICS (SYLLABUS D)**

**4024/21**

Paper 2, maximum raw mark 100

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### Abbreviations

cao	correct answer only
cso	correct solution only
dep	dependent
ft	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
www	without wrong working

### SECTION A

Qu	Answers	Mark	Comments
<b>1</b>	<b>(a)</b> 37.35 and A	2	M1 for $315 \times 0.05 + 720 \times 0.03$
	<b>(b) (i)</b> \$0.05	1	
	<b>(ii)</b> Large <u>and</u> 0.0485 seen oe	1	
	<b>(c)</b> 890	3	M1 for $\frac{1134.75}{0.85}$ M1 for their $1335 - (375 + 70)$
<b>2</b>	<b>(a)</b> (7, 9)	1	
	<b>(b) (i)</b> $y = 2x - 5$	2	M1 for gradient $\frac{(15 + 21)}{(10 + 8)} (= 2)$
	<b>(ii)</b> Yes <u>and</u> $-9 = 2 \times -2 - 5$	1ft	ft correct conclusion from their equation with the working shown
	<b>(c) (i) (a)</b> (-5, 0)	1	
	<b>(b)</b> $\left(\frac{4p - 15}{3}, p\right)$	2	M1 for line through (4, 9) and (6, 6)
<b>(ii)</b> (5, 7 ½)	2	B1 for either $x$ or $y$ coordinate	
<b>3</b>	<b>(a) (i)</b> 10.6 – 10.62	2	M1 for $\tan 37 = \frac{8}{QR}$
	<b>(ii)</b> 192	2	M1 for $4^3$ seen
	<b>(b)</b> 6.40	2	M1 for $\frac{46.62}{0.45}$
	<b>(c)</b> 18	2	M1 for ( $k =$ ) 90 oe or $\frac{3}{5} \times 30$

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4	(a) $4x + 5y + 4x + 5y = 1020$ leading to $4x + 5y = 510$ $6x + 3y + 6x + 3y + 4x + y + 4x + y = 1360$ leading to $5x + 2y = 340$	1	
	(b) $x = 40, y = 70$	3	M1 for an attempt to make the coefficients of $x$ or $y$ equal M1 for subtracting the two equations
	(c) 0.56	2ft	M1 for figs $0.8 \times 2.1$ and figs $1.6 \times 0.7$ After 0, SC1 for answer figs 56 ft $(2 \times \text{their } x \times \text{their } y) / 10\,000$
5	(a) (i) $\begin{pmatrix} -10 & -4 \\ 15 & 7 \end{pmatrix}$	2	B1 for 3 correct terms
	(ii) $\begin{pmatrix} -0.5 & -1 \\ 1.5 & 2 \end{pmatrix}$	2	B1 for $\frac{1}{2} \times (2 \times 2 \text{ matrix})$ or for $\begin{pmatrix} -1 & -2 \\ 3 & 4 \end{pmatrix}$ soi
	(b) (i) 13	2	M1 for $12^2 + 5^2 (= 169)$
	(ii) $\begin{pmatrix} 8 \\ 6 \end{pmatrix}$	1	
	(c) (i) $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$	1	
	(ii) (18, 9)	1	
	(iii) 22	3ft	M1 for $12 \times (\text{their } 9 - 3)$ M1 for an attempt to subtract area of 3 triangles
6	(a) (i) (a) Translation cao $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$	1	
		1	
	(b) Enlargement cao Scale factor 3, Centre (6, 4)	1	
		1	
	(ii) (a) (-1, -2)	1	
	(b) (-1, 0)	1	
	(b) (i) Kite	1	
	(ii) (1, 3)	1	Also (4, -1) is correct for 1
	(4, 2)	1	

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SECTION B

7	(a) 30.4 to 30.45	4	M1 for $16^2 + 20^2 \pm (2) \times 16 \times 20 \cos 115^\circ$ M1 for $\sqrt{656 - 640\cos 115}$ A1 for 926.(47....)
	(b) $16\cos 25^\circ$ oe	2	M1 for $\cos 25 = \frac{x}{16}$
	(c) (i) 28 www	2	M1 for $\frac{1}{2}(20 + AD) \times 14.5 = 348$
	(ii) $\frac{1}{2} \times 28 \times 14.5 (= 203)$ or $348 - \frac{1}{2} 20 \times 16 \sin 115$	1	$\frac{1}{2} 30.4 \times 28 \sin 28.5$
	(iii) 28.4 to 28.5	3ft	M1 for $\frac{1}{2} \times 30.4 \times 28 \times \sin CAD = 203$ M1 for $\sin CAD = \frac{203}{\frac{1}{2} \times 30.4 \times 28}$ ft their AC and their AD
8	(a) (i) $y^2 + 18y + 81 = y^2 + y^2 + 10y + 25$ $y^2 - 8y - 56 = 0$	2	M1 for $(y + 9)^2 = y^2 + (y + 5)^2$ oe
	(ii) 12.5, -4.5	3	M1 for $y = \frac{8 \pm \sqrt{8^2 + 4 \times 56}}{2}$ soi A1 for one solution or 12.48(5)... <u>and</u> -4.48(5)...
	(iii) 21.5	1ft	ft 9 + their positive y
	(b) (i) (a) $\hat{QOS} = 90 - x$ and conclusion	1	
	(b) (b) $\frac{1}{2}(90 + x)$ oe cao	2	M1 for $\frac{1}{2}(180 - (90 - x))$
	(ii) (a) $3 \times \frac{1}{2}(90 - x)$ $= 2 \times \frac{1}{2}(90 + x)$ leading to $180 + 2x$ $= 270 - 3x$	2	M1 for $3 \times \frac{1}{2}(90 - x) = 2 \times$ their OQS
	(b) 18	1	
9	(a) (i) Histogram with heights 0.14, 0.56, 0.74, 0.42 and 0.2 widths 100, 50, 50, 50, 100	3	B2 for 4 correct columns or B1 for at least 1 correct column After 0, SC2 for "correct" histogram or SC1 for at least 3 "correct" columns (e.g. no vertical or horizontal scale)
	(ii) 14 – 16	1	
	(iii) 200 $m < 250$	1	
	(iv) $\frac{7}{20}$ cao	1	

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	(b) $(p =) 35$	3	M1 for $\frac{125 \times 14 + 175p + 225 \times 26}{40 + p} = 183$ M1 $183p - 175p = 1750 + 5850 - 7320$
	(c) (i) 1	1	
	(ii) $\frac{49k}{750k}$	2ft	M1 for $\frac{7}{20} \times \frac{14}{75}$ ft their $\frac{7}{20}$ and their 75
10	(a) 32	2	M1 for $\frac{200}{6.2}$
	(b) (i) 1.13	3	B2 for figs 1128.....(or 113) <u>or</u> M1 for fig $0.2 = \pi r^2$ fig 5
	(ii) (a) 56.5 to 56.51	3	M1 for $\pi \times 1.9^2 \times 5$ M1 for their volume – 0.2
	(b) 53	2ft	M1 for $\frac{3000}{56.5}$ ft their 56.5 with rounding down to an integer
	(c) 12.9	2	M1 for $2 \times \pi \times 1.9 (= 11.9)$
11	(a) (i) 35	1	
	(ii) 360	1	
	(iii) 7	1	
	(b) (i) 10	1	
	(ii) (8.00 , 0) to (8.15 , 10) (8.15 , 10) to (8.23 , 22) (8.23 , 22) to (8.47 , 30)	2ft	B1 for 2 correct lines ft their 10 and their 10 + 12
	(iii) 20	2ft	M1 for $\frac{8}{24}(\times 60)$ ft $\frac{18 - \text{their } 10}{24/(60)}$
	(c) (i) 12.29 cao	2	M1 for $\sin 55 = \frac{MK}{15}$ oe
	(ii) $247^\circ$	1	
	(iii) 10.2 to 10.7	1	