

**MARK SCHEME for the May/June 2010 question paper
for the guidance of teachers**

4024 MATHEMATICS (SYLLABUS D)

4024/12

Paper 12, maximum raw mark 80

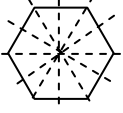
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Qu	Answers	Mark	Part Marks
1	(a) 0.7	1	
	(b) 60	1	
2	(a) $\frac{11}{35}$	1	
	(b) $\frac{18}{35}$	1	
3	(a) 22	1	
	(b) 1380	1	
4	(a) 10	1	
	(b) $\frac{1}{3}$	1	
5	0.5	2	B1 for two of 50, 0.2 and 4 seen
6	(a) 2.5	1	
	(b) $\frac{p+r}{2}$	1	
7	(a) 	1	
	(b) Rectangle, parallelogram or rhombus drawn	1	
8	(a) 81	1	
	(b) 24	1	
9	(a) $2^2 \times 5 \times 7$	1	
	(b) 28	1	
	(c) 42	1	
10	(a) 40 24	2	C1 for one correct or M1 for $\frac{x}{x-16}$ or $\frac{y+16}{y} = \frac{5}{3}$ or $\frac{5}{8}z = \frac{3}{8}z + 16$
	(b) 2.5	1	
11	(a) -1.5	1	
	(b) $\frac{5}{3x+2}$	2	C1 for $\frac{5}{3y+2}$ or $\frac{5}{ax+b}$ with $a = 3$ or $b = 2$ or B1 for $3xy = 5 - 2x$ or $3yx = 5 - 2y$ or better seen

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12	(a) $\frac{12}{x^2}$	2	C1 for $\frac{k}{x^2}$ or B1 for $k = 12$ seen or $y = \frac{k}{x^2}$ with k or k any number
	(b) $2 - 2$	1	
13	$(x =) 5 \quad (y =) - 4$	3	C2 for one correct with working. M1 for a correct method to eliminate one variable, reaching such as $11x = k$, $hx = 55$, $11y = p$ or $qy = -44$
14	(a) $-2 \quad 5.5$	1	
	(b) $y = -0.75x + 4$	2	C1 for $y = -0.75x + c$ or $y = mx + 4$ or B1 for $m = -0.75$ or $c = 4$ soi or a line through either point $(-8, 10)$ or $(4, 1)$
15	(a) 52	1	
	(b) 52	1	Accept their (a) ft
	(c) 38	1	Accept 90 – their (b) ft
16	(a) Correct completion with $\frac{4}{10}$, $\frac{4}{9}$, $\frac{6}{9}$ and $\frac{3}{9}$	1	
	(b) $\frac{7}{15}$	2	C2 for a correct ft from (a) M1 for $\frac{6}{10} \times \frac{5}{9} + \frac{4}{10} \times \frac{3}{9}$
17	(a) $2p + 3q$	1	
	(b) $2p + 2q$	1	
	(c) $-2p + q$	1	Accept $3q$ – their (b) ft
18	(a) $\frac{\pi r^2}{6}$	1	
	(b) $2r + \frac{\pi r}{3}$	2	B1 for $\frac{60}{360} \times 2\pi r$ seen
19	(a) $\begin{pmatrix} 3 & -1 \\ 0 & -1 \end{pmatrix}$	1	
	(b) $\begin{pmatrix} 3 & -1 \\ 2 & 1 \\ 1 & 0 \\ 2 & 2 \end{pmatrix}$ o.e.	2	B1 for $\frac{1}{2}$ or $\begin{pmatrix} 3 & -2 \\ 1 & 0 \end{pmatrix}$ or $(\det =) 2$

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20	(a) 39	1	
	(b) 14	2	B1 for 46 or 32 seen
	(c) 9	1	
21	(a) (i) $3x(x - 4)$	1	
	(ii) $(x + y)(x - 2y)$	1	
	(b) $\frac{x}{x - 4}$	2	B1 for $x(x + 4)$ or $(x + 4)(x - 4)$ seen
22	(a) 2 500 000	1	
	(b) (i) 395	1	
	(ii) 340	2	B1 for 5.5 seen
23	(a) 34	2	M1 for $\frac{16}{AB} = \cos\theta$ soi
	(b) 480	2	B1 for height of $ABC = 16 \tan \theta$ o.e. or for $\frac{1}{2} \times 32 \times \text{their } 34 \times \sin \theta$ or M1 for any correct method
24	(a) T with vertices (5, 6), (3, 6) and (3, 2)	2	C1 for two vertices correct or for T same orientation as P and correct size
	(b) Rotation 90° anticlockwise about (0, 0)	2	B1 for Rotation or 90° anticlockwise about (0, 0) oe
	(c) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$	1	
25	(a) 108	1	
	(b) 0.5 – 0.9 with tangent drawn at $t = 18$	2	C1 for 0.5 – 0.9 or B1 for tangent at $t = 18$
	(c) Correct distance / time graph	2	B1 for curve from (0, 0) to (8, 36) with correct curvature or straight line from (8, 36) to (16, 108ft)
26	(a) Correct triangle	2	B1 if no arcs seen or arcs seen but sides in the wrong order or arcs seen, but only one side the correct length
	(b) Correct region shaded	3	B1 for arc radius 7, centre B B1 for perp. bisector of AB