

MARK SCHEME for the May/June 2007 question paper

4024 MATHEMATICS

4024/01

Paper 1, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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Page 2	Mark Scheme	Syllabus	Paper
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1	(a) $15\frac{1}{2}$ or 15.5	1	Not 31/2
	(b) (0).175	1	2
2	(a) $\frac{11}{28}$	1	If answer decimal in range 0.39 to 0.40, accept fraction in working
	(b) 10	1	2
3	(d=) 12 (implied by 8/12)	1	Accept answer reversed without evidence After 0+0.allow M1 for $\frac{8 \times 3}{2}$ or $\frac{39 \times 2}{3}$ seen M1
	(n =) 26 (implied by 26/39)	1	2
4	(a) (0).6 or $\frac{3k}{5k}$ (m/s ²)	1	Accept – 0.6 etc
	(b) 72 (km/h)	1	2
5	(a) $\frac{66}{100}$ $\frac{666}{1000}$ 0.6r 0.67 or 0.6 $\frac{66}{100}$ $\frac{666}{1000}$ 0.67	1	Accept any equivalents
	(b) 1.507×10^9 cao	1	2
6	(a) $2 \times 7 \times 11$ ($\times 1$)	1	Accept without “ \times ” if clear (e.g. 2, 7, 11)
	(b) 1078 cao	1	2
			12
			12
7	(a) 36	1	Accept 36°
	(b) B + C = 180 or A + D = 180	1	2
			Accept reference to interior or allied angles supplementary

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8	(a) R correctly marked	1	2 squares “below” P	
	(b) $-\frac{3}{4}$ or $-(0).75$	1	2	
9	(a) y marked in correct region	1	Within $A \cap B'$. Not just shading	
	(b) (i) 6	1	<u>Without</u> brackets or braces	
	(ii) 4, 5	1	3	Ignore extra braces
10	(a) $(-1, 3)$	1		
	(b) $y < 3$ oe	1	Accept \leq for $<$ etc in both cases	
	$y > \frac{1}{2}x$ oe	1	3	Both reversed, after 0 + 0 allow C1
			10	10
11	(a) (i) $p = 40$	1		
	(ii) $q = 18$	1	Accept answer(s) reversed without evidence	
	(b) Rectangle, width 30, height 0.4	1	3	
12	(a) 1	1		
	(b) 32	1	Accept ± 32 , but not -32 alone	
	(c) 25	1	3	
13	(a) 4	1		
	(b) (i) 2	1	Accept $\frac{2}{1}$ or $\frac{4}{2}$	
	(ii) 1.1 to 1.3	1	3	Ignore any value of y
			9	9

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14 (a) $6\pi x$ (cm) only	1	Accept numerical π in both parts
(b) $3\pi x^2$ (cm ²) or unsimplified equiv (e.g. $4\pi x^2 - \pi x^2$)	2 3	$3\pi x^2 / 2$ or unsimplified equiv C1 or area larger (semi)circle = $(\frac{1}{2})\pi(2x)^2$ M1 or area smaller (semi)circle = $(\frac{1}{2})\pi x^2$ M1
15 (a) 42 (cm ²)	1	
(b) 16 (cm)	2 3	Use of similar triangles e.g. $\frac{h-4}{h} = \frac{9}{12}$ M1 or use their BCDE = $\frac{1}{2} 12(4+h) - \frac{1}{2} 9h$
16 (a) $\frac{2}{3}$	1	Accept 0.666 or better
(b) $\frac{3x+4}{5}$ asc	2 3	$ax + b$ with $a = 3/5$ $b \neq 0$ or $a \neq 0$ $b=4/5$ seen M1 Use of letter other than x , give - 1 if possible
17 (a) ($DCB =$) 140	1	Not reflex angle
(b) ($DCF =$) 105 or $\{245 - \text{their (a)}\} \checkmark$	1	No \checkmark for 122.5 then 122.5
(c) ($EFC =$) 75 or $\{180 - \text{their (b)}\} \checkmark$	1 3	SC 155, 90, 90 scores 0, 1 \checkmark , 0
18 (a) (\$) 14 000	1	
(b) 25 (%)	2 3	Answer 75 or 125 C1 figs $\frac{4.20-3.15}{4.20}$ oe seen M1
	15	15

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19 (a)	$AY = BC (=3)$ $CY = AB (=5)$ AC common Triangles congruent	2	Conclusion must be stated but SSS not needed unless extra facts are quoted Two correct pairs of facts stated C1
(b)	Area $AYC = \text{area } ABC$ (Add ACX) $AYCX = ABCX$	1	Use of “right angle” scores 0
(c)	Kite	1	4

20 (a)	1 : 500	1	Accept 500
(b) (i)	Triangle drawn with angles $35^\circ \pm 2^\circ$ and $70^\circ \pm 2^\circ$	1	
(ii)	340 or 200	1	Accept $340^\circ \pm 2^\circ$ or $200^\circ \pm 2^\circ$
(iii)	28 to 31 (m)	1	4 dep on scoring 1 in (b)(i)
			8

21	Condone missing outside brackets, “= 0” and use of wrong letter if clear. If only “solutions” (even incorrect) in answer space, give marks if factors seen		
(a)	$(2x + 3)(x - 5)$ oe	2	$(2x - 3)(x + 5)$ C1 or $\frac{7 \pm \sqrt{169}}{4}$ or better seen M1
(b)	$(2y - z)(t - 4s)$ oe	2	4 Complete correct extraction of one factor M1 such as $2yt - 8ys - z(t - 4s)$

22 (a) (i)	$k > 2$	1	Accept $2 < k$ Not just 2
(ii)	$(t =) 30$	1	
(b)	$x = 18\frac{1}{2}$ or 18.5 $y = 10\frac{1}{2}$ or 10.5	3	5 $x = \frac{37k}{2k}$ and $y = \frac{21k}{2k}$ seen C2 or one correct with supporting working C2 or one correct improper answer with supporting working C1 or correct method to eliminate x or y , M1 condoning 1 arithmetic slip

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23 (a) (i)	$x^2 - 4x = 0$ correctly obtained	AG 2		$(3x + 1)^2 = (x + 1)^2 + (3x)^2$ oe seen M1 [Condone $3x^2$ for $(3x)^2$ for M1 etc]
(ii)	$(x =) 4$	1		Ignore $x = 0$
(iii)	$-\frac{5}{13}$ or $-\frac{\text{their (ii)}+1}{3 \text{ their (ii)}+1}$	$\sqrt{\quad}$	1 5	If answer decimal look back for fraction
			14	14

24 (a)	$\begin{pmatrix} 3 \\ 7 \\ 0 \end{pmatrix}$		1	
(b) (i) (a)	$(p =) 5$		1	
(b) (i) (b)	$(w =) 4$ or $14 - 2 \times \text{their } p$	$\sqrt{\quad}$	1	Only allow $\sqrt{\quad}$ if their $w > 0$
(ii)	7600		1	Ignore lack of braces
(iii)	Total cost of making (100) buses and (200) lorries		1 5	Accept reasonable equivalents involving cost (and toys)
25 (a) (i)	$125 < h \leq 135$ implied		1	Not just 20
(ii)	126.25, 126.2, 126.3, 126 or $126\frac{1}{4}$		3	or Correct method such as $\frac{5 \times 110 + 10 \times 120 + 20 \times 130 + 5 \times 140}{5 + 10 + 20 + 5}$ M2 condoning one error or omission or consistent use of wrong h in above M1 or $5 \times 110 + 10 \times 120 + 20 \times 130 + 5 \times 140$ M1
(b) (i)	11 (cm)		2	121 or 132 used
(ii)	16		1 7	
			12	12
