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GCSE

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Mathematics A 1387

Summer 2006

Mark Scheme (Results)

NOTES ON MARKING PRINCIPLES

1 Types of mark

- M marks: method marks
- A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao – correct answer only
ft – follow through
isw – ignore subsequent working
SC: special case
oe – or equivalent (and appropriate)
dep – dependent
indep - independent

3 No working

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

4 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
If there is no answer on the answer line then check the working for an obvious answer.

5 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

6 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. incorrect cancelling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

7 Probability

Probability answers must be given a fractions, percentages or decimals.

If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

8 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

9 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

Paper 5525_05					
No		**Working**	**Answer**	**Mark**	**Notes**
1	(a)	$x^2 = \frac{108}{3}$	6	2	M1 $(x^2 =)\frac{108}{3}$ (=36) or 36 seen A1 cao 6 or -6 or both. Also accept $\sqrt{36}$
	(b)	$2 \times 54 = 2 \times 2 \times 27$	$2 \times 2 \times 3 \times 3 \times 3$	3	M1 for attempt at continual prime factorisation (at least 2 correct steps); could be shown as a factor tree. A1 all 5 correct prime factors and no others A1 $2 \times 2 \times 3 \times 3 \times 3$ or $2^2 \times 3^3$ oe
2	(a)		5, −1, 1	2	B2 all three correct (B1 one or two correct)
	(b)			2	B1ft points plotted correctly ± 1 full square B1 smooth curve through their plotted points provided at least B1 awarded in (a).
	(c)		3.6, −0.6	2	B2 for x= 3.4 to 3.8 and -0.8 to -0.4 otherwise ft ± 1 full square depends on at least B1 in (b) (B1 for one value or line y= 3 seen)
3		10.5×5	52.5g	2	M1 10.5×5 A1 cao
4			overlay	4	M1 quarter "circle" drawn centre A inside rectangle (ignore lines outside the rectangle) A1 radius 4 cm ±2mm B1 line drawn 1 cm ±2mm from *DC*. B1 ft (dep on two loci attempts drawn) region shaded
5			$\frac{26}{60}$	2	M1 $(16+10)\div'60'$ or 26 seen or $\frac{16}{60}$ A1 oe
6		$\frac{400 \times 6}{0.2} = \frac{2400}{0.2}$	12000-12500	3	M1 two of 400, 6, 0.2 A1 $\frac{2400}{0.2}$ or $\frac{2460}{0.2}$ or 2000×6 or 2050×6 or 400×30 or 410×30 A1 answer in range 12000 – 12500

Paper 5525_05				
No	**Working**	**Answer**	**Mark**	**Notes**
7 (a)		126.5g	1	B1 cao
(b)		127.5g	1	B1 127.5 or $127.4\dot{9}$ or 127.49…. or 127.499
8	How many pizzas have you eaten in the last week? 0 | 1 | 2 | 3 | More than 3	Include a time period Proper response boxes	2	B1 include a time period B1 at least 3 numeric response boxes
9 (a)		4.56×10^{5}	1	B1 cao
(b)		3.4×10^{-4}	1	B1 cao
(c)		1.6×10^{8}	1	B1 cao
10 (a)		$(x+2)(x+4)$	2	M1 $(x\pm2)(x\pm4)$ A1 cao
(b)		$-2,\ -4$	1	B1 ft from (a) or −2, −4
11 (a)	SF = 1.5	39 cm	2	M1 SF = $\frac{12}{8},\ \frac{8}{12},$ 1.5, 0.6 … oe A1 cao
(b)	$45\times\frac{8}{12}$	30 cm	2	M1 $45\times\frac{8}{12},\ 45\div\frac{12}{8}$ oe A1 cao
12 (a)		$x=3,\ y=2$	1	B1 cao
(b)		(4,2), (5,1) (5,2), (5,3)	3	B3 all correct and none incorrect B2 at least 2 correct and not more than 4 points B1 line $x=6$ drawn or one point correct

Paper 5525_05					
No		**Working**	**Answer**	**Mark**	**Notes**
13	(a)	He has taken it from this year instead of last year		1	B1 Reason or appropriate calculation
	(b)	$\frac{240}{1.2}$	200	2	M1 $\frac{240}{1.2}$ oe A1 cao
14	(a)		12, 33, 69, 92, 100	1	B1 cao
	(b)			2	B1 ft for 4 or 5 points plotted correctly ± 1 full 2 mm square at the end of interval dep on sensible table (condone one addition error) B1 dep for points joined by curve or line segments provided no gradient is negative . Ignore any point of graph outside range of their points. SC: B1 if 4 or 5 points plotted not at end but consistent within each interval and joined .
	(c)		62- 64 hours	2	B1 62-64 otherwise ft from cumulative freq graph B1 for hours
15	(a)	90	90º	2	B1 90^0 B1 angle in semi circle (= 90^o)
	(b)	$70 \div 2$	35º	2	B1 35^0 or 325^0 B1 angle at centre = twice angle at circumference OR B1 angle on a straight line *with* isosceles triangle

Paper 5525_05				
No	**Working**	**Answer**	**Mark**	**Notes**
16 (a)	$T = kM$ $k = \frac{600}{250}$ $T = \frac{600}{250} \times 400$	960	3	M1 for $T = km$ or $\frac{600}{250} = \frac{T}{400}$ oe M1 for $(k =)\frac{600}{250}$ (=2.4) or $(T =)400 \times \frac{600}{250}$ A1 cao
(b)	$T = \frac{K}{P}$ $T = \frac{1400 \times 360}{900}$	560	3	M1 for $T = \frac{K}{P}$ or $\frac{T}{1400} = \frac{360}{900}$ oe M1 for $(K =)1400 \times 360$ or $360 = \frac{K}{1400}$ or (K =) 504000 or $(T =)\frac{360 \times 1400}{900}$ oe A1 cao
17 (a)		$\begin{pmatrix} 4 \\ 3 \end{pmatrix}$	2	M1 subtraction of coordinates or position vectors or $\begin{pmatrix} 4 \\ y \end{pmatrix}$ or $\begin{pmatrix} x \\ 3 \end{pmatrix}$, where x and y are integers A1 cao SC: B1 for $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$ or $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$
(b)	$R = (6, 10), S = (2,7)$ $\overrightarrow{QS} = \begin{pmatrix} 2 \\ 7 \end{pmatrix} - \begin{pmatrix} 6 \\ 6 \end{pmatrix}$	$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$		B2 for $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ B1 for $\begin{pmatrix} -4 \\ y \end{pmatrix}$ or $\begin{pmatrix} x \\ 1 \end{pmatrix}$, where x and y are integers

Paper 5525_05				
No	**Working**	**Answer**	**Mark**	**Notes**
18 (a)	$\frac{3x}{x}+\frac{3x}{2x}=2x$	$x=\frac{9}{4}$	2	M1 for $\frac{6+3}{2x}$ or $\frac{3}{x}\times x+\frac{3}{2x}\times x=2\times x$ or $\frac{6x+3x}{2x^2}=2$ A1 $\frac{9}{4}$ oe
(b)	$(y-1)^2=\frac{9}{4}$ $y-1=\pm\frac{3}{2}$	$y=\frac{5}{2},\quad -\frac{1}{2}$	3	M1 $(y\text{-}1)^2=$ "$\frac{9}{4}$" or $4y^2-8y-5=0$ oe A1 cao $\frac{5}{2}$ oe A1 cao $-\frac{1}{2}$ oe
19 (a)		Heights 24,32	2	B1 cao for bar from 15 – 17.5, height 24 × 2mm squares B1 cao for bar from 17.5 – 20, height 32 × 2mm square
(b)		Freqs 40, 20, 15	2	B2 cao for all 3 correct (B1 for any 1 or 2 correct)
(c)	Area up to 12.5 = $220x$ Area above 21 = $156x$ Frequency = $\frac{156x}{220x}\times 110$	78	3	M1 for attempt to find area upto 12.5 **and** area above 21 consistantly M1 for $\frac{156}{220}\times 110$ or $\frac{6.24}{8.8}\times 110$ or $156\times\frac{110}{220}$ oe A1 78 cao SC: If no marks earned B1 for $2mm^2$ = 1 person oe

Paper 5525_05				
No	**Working**	**Answer**	**Mark**	**Notes**
20 (a)		2	1	B1 cao
(b)		1.5	1	B1 1.5 oe
(c)	$8\times\sqrt{4}\times\sqrt{2}$	$16\sqrt{2}$	2	M1 ($\sqrt{8}$ =) $\sqrt{4\times2}$ or $\sqrt{2}\times\sqrt{2}\times\sqrt{2}$ or $\left(2^3\right)^{"\frac{3}{2}"}$ A1 for $16\sqrt{2}$ (accept m = 16)
(d)	$\frac{1}{8\sqrt{8}}\times\frac{\sqrt{8}}{\sqrt{8}}$ $=\frac{\sqrt{8}}{64}=\frac{\sqrt{2}}{32}$	$\frac{\sqrt{2}}{32}$	2	M1 $\frac{1}{8\sqrt{8}}\times\frac{\sqrt{8}}{\sqrt{8}}$ or $\frac{1}{8\sqrt{8}}\times\frac{8\sqrt{8}}{8\sqrt{8}}$ or $\frac{1}{"16\sqrt{2}"}\times\frac{\sqrt{2}}{\sqrt{2}}$ oe or $\frac{1}{8\sqrt{8}}\times\frac{\sqrt{2}}{\sqrt{2}}$ A1 for $\frac{\sqrt{2}}{32}$ (accept p = 32)
21 (a)	*BC = CE* equal sides *CF = CD* equal sides *BCF = DCE* = 150° *BFC* is congruent to *ECD* **(SAS)**		3	B1 for either *BC = CD* or *BC = CE* *CF = CE or CF = CD* B1 for *BCF = DCE = 150°* or correct reason B1 for proof of congruence
(b)	So *BF=ED* (congruent triangles) *BF = EG* (opp sides of parallelogram)		2	B1 *BF = EG* or *BF = ED* B1 fully correct proof
22	$(n+a)P=n^2+a$ $nP+aP=n^2+a$ $a(P-1)=n^2-nP$	$a=\frac{n^2-nP}{P-1}$	4	M1 $(n+a)P=n^2+a$ M1 $nP+aP=n^2+a$ M1 $a(P-1)=n^2-nP$ or $a(1-P)=nP-n^2$ A1 for $a=\frac{n^2-nP}{P-1}$ oe

Paper 5525_05					
No		**Working**	**Answer**	**Mark**	**Notes**
23	(a)		$(2x-3)(x-2)$	2	B2 cao B1 $(2x-a)(x-b)$, where $ab=6$
	(b)(i)	$(n-a)(n+a-(n-a))$ or $n^2-a^2-(n^2-2an+a^2)$	$2a(n-a)$		M1 for $(n-a)(n+a)$ seen A1 cao or M1 for $n^2-2an+a^2$ seen A1 cao
	(b)(ii)		a and $n-a$ are integers $2\times n\times(n-a)$ is even	4	M1 dep for identifying $n-a$ as an integer or multiplying by 2 gives an even number or M1 dep for identifying an or a^2 as an integer, or for the difference of two even numbers is an even number A1 correct proof
24	(a)(i)		(0,–1)	3	B1 cao
	(ii)		(2,-3)		B1 cao
	(iii)		(1,–1)		B1 cao
	(b)		$y=\mathrm{f}(-x)$	1	B1 cao
	(c)		Translation by + 2 parallel to the y axis	1	B1 for translation by $\begin{pmatrix}0\\2\end{pmatrix}$