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Edexcel GCSE

Mathematics A 1387

Paper 5523/04

November 2006

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Mark Scheme (Results)

Edexcel GCSE

Mathematics A 1387

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.

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No		Working	Answer	Mark	Notes
1			Correct shape	2	B2 (B1 for any one side correct, or all correct but scale factor other than 1 or 3) Tolerance: to within half square.
2		13 × 5.5(0) or 71.5(0) 103 − 71.5(0) or 31.5(0) 31.5(0) ÷ 9	3.50	4	M1 for 13 × 5.5(0) or 71.5(0) seen M1 for 103 − "71.5(0)" or 31.5(0) seen M1 for "31.5(0)" ÷ 9 A1 for 3.50 Condone 3.5
3	(a)		$5p + 2q$	2	B2 (B1 for $5p$ or $\pm 2q$)
	(b)		$y^2 - 5y$	1	B1
	(c)	$6m + 8 + 3m - 15$	$9m - 7$	2	M1 for correct expansion of at least one bracket A1 for $9m - 7$
4	(a)	$\frac{180 - 120}{2}$	30	2	M1 for $\frac{180 - 120}{2}$ A1 for 30 cao
	(b)	$\angle ABD = 150°$ seen 360 − ("150" + 54 + 108)	48	3	M1 for $\angle ABD = 150°$ seen or 180 – (a) (may be stated or shown on diagram) M1 for 360 − ("180-(a)" + 54 + 108) A1 for 48 ft from acute (a) **OR:** M1 for 54+120 (=174) M1 360 – ("174"+"30"+108) A1 for 48 ft from acute (a)
5			Correct shape	2	B2 (B1 for one complete flag or two correct poles)
6			$h = 70t + 80$	3	B1 for h = linear expression in t B2 for $70t + 80$ (B1 for $70t$)

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No		**Working**	**Answer**	**Mark**	**Notes**
7			0 | 12466 1 | 133555899 2 | 22455889 3 | 03 4 | 6 eg 1 | 3 represents 13	3	B1 for stem 0, 1, 2, 3, 4 or 0, 10, 20, 30, 40 B1 for accurate leaves – condone 1 error or omission (could be unordered) B1 for key and correct ordered leaves
8	(a)	$\frac{35}{1+4}$	7	2	M1 for $\frac{35}{1+4}$ A1 for 7 cao
	(b)	4×18 or 72 or 5×18	90	2	M1 for 4×18 or 72 or 5×18 A1 for 90 cao
9			Correct trapezium	3	B1 for accurately placed D B1 for accurately placed C B1 for two pairs of arcs at D and C, centred on base vertices
10	(a)	$\frac{216}{4.5}$	48 mph 0.8 m/min	4	M1 for $\frac{216}{\text{time}}$ eg time= 4h30, 4.5, 4.3, 270 B1 for the digits 45 seen A1for 48 cao or 0.8 cao B1(indep) for mph or m/h, m/min (must be consistent)
	(b)(i) (ii)		22.5 23.5	2	B1 cao B1 23.5 or 23.49 or 23.49… or 23.4999(9…) oe
11		$6x - 2x = 9 + 5$ $4x = 14$	$3\frac{1}{2}$	3	M1 for correct rearrangement: $6x - 2x = 9 + 5$ or intent shown (correct signs) M1 $4x = 14$ A1 for $3\frac{1}{2}$ oe accept $\frac{14}{4}$

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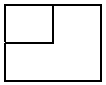
No		Working	Answer	Mark	Notes
12	(a)			2	B2 for elevation with correct orientation (B1 incorrect orientation)
	(b)			2	B2 for correct plan; internal square can be in any corner. (B1 for 2 by 2 square with missing/extra internal lines)
13	(a)		-6, -16	2	B2 cao (B1 for one correct value)
	(b)		$2(n-5)$	1	B1oe eg $2n$-10; NB n^{th} = B1, n= B0
	(c)	"$2(n-5)$" = y or $\div 2 + 5$	$\frac{y+10}{2}$ or $\frac{y}{2}+5$	2	M1 for "$2(n-5)$" = y or $\div 2 + 5$ A1for $\frac{y+10}{2}$ or $\frac{y}{2}+5$ or $\frac{1}{2}(y + 10)$ or $(y + 10) \div 2$ (Sc B1 for ambiguous statements eg $y + 10 \div 2$)
14	(a)	$\frac{4}{100}\times 2664$	2770.56	3	M1 for $\frac{4}{100}\times 2664$ (=106.56) M1 (dep) for "106.56" + 2664 A1 for 2770.56
	(b)	$121.6(0)\times\frac{100}{4}$	3040	2	M1 for $121.6(0)\times\frac{100}{4}$ oe A1 cao
	(c)	1.04 oe seen $2828.8 \div 1.04$	2720	3	B1 for 1.04 oe seen accept 104% M1 for $2828.8 \div 1.04$ oe A1 for 2720
15	(a)	$\frac{\sqrt{25.96}}{4.05} = \frac{5.09509...}{4.05}$	1.258048316	2	M1 for 5.09… or 4.05 or 25.96 seen A1 for at least 4 sf rounded or truncated: 1.258(048316…) or 1.26
	(b)		1.26	1	B1 for 1.26 or ft from (a); 1.260 gets B0

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No		Working	Answer	Mark	Notes
16	(a)	prime factors 2 and 7 seen	$2 \times 2 \times 2 \times 7$	2	M1 for prime factors 2 and 7 seen A1 for $2 \times 2 \times 2 \times 7$ or $2^3 \times 7$
	(b)		14	1	B1 for 14 cao
17	(a)	$\frac{90}{240} \times 360$	135	2	M1for $\frac{90}{240}$ A1 for 135
	(b)		$15 \leq t < 20$	1	B1 for $15 \leq t < 20$ Accept 15-20
	(c)		95 185 220 235 240	1	B1 for all correct
	(d)		Points	2	B1 ft for at least 4 or 5 pts plotted correctly ($\pm$ 1 sq) at ends of interval dep on sensible table (cf; no more than 1 error)
			curve or line segment		B1(dep on previous B1) for pts joined by curve/line segments provided no gradient is negative (SC: B1 if 4 or 5 pts plotted not at ends but consistently within each interval **and** joined)
	(e)		20.5-22.0	1	B1 ft from a cf graph using cf = 120 (.5)

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No	**Working**	**Answer**	**Mark**	**Notes**
18 (a)	3.1 | 68.2(31) 3.2 | 73.7(28) 3.3 | 79.4(97) 3.4 | 85.5(44) 3.5 | 91.8(75) 3.6 | 98.4(96) 3.7 | 105.4(13) 3.65 | 101.9(1725)	3.6	4	B2 for trial $3.1 \le x \le 3.7$ evaluated (B1 for trial $3 < x < 4$ evaluated) B1 for different trial $3.615 \le x \le 3.65$ evaluated B1 for 3.6, (dep on at least one of 2 previous Bs) or anything that rounds to 3.6 Values evaluated can be rounded or truncated, but to at least 1 d.p.
(b)(i)		$x^2(x+4) = 100$	2	B1 for $x^2(x+4)$ seen or $x \times x \times x + 4$ *OR* "3.6"^{3}+4×"3.6"^{2} ≈ 100 (dep on 3.6≤(a)≤3.7); (46.656+4×51.84)
(ii)		7.6		B1 ft from "3.6" ie "3.6" + 4
19	$168^2 + 157^2 = 28\,224 + 24\,649$ $= 52\,873$ $\sqrt{28224 + 24649}$	229.9 - 230	3	M1 for $168^2 + 157^2$ M1 $\sqrt{168^2 + 157^2}$ or $\sqrt{28224 + 24649}$ or $\sqrt{52873}$ ie not doubling A1 for 229.9-230
20	$\frac{8}{25} \times 1750$ or 0.32×1750 or 8×70	560	3	M1 for $\frac{8}{25}$ oe seen or $\frac{1750}{25}$ oe seen or 0.32 or 70 seen M1 for $\frac{8}{25} \times 1750$ oe A1 for 560

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No	**Working**	**Answer**	**Mark**	**Notes**
21	$\cos x = \frac{3.9}{4.7} = 0.8297\ldots$	33.9	3	M1 for $\cos = \frac{3.9}{4.7}$ (= 0.8297…) M1 for $\cos^{-1}\frac{3.9}{4.7}$ or $\cos^{-1}\frac{4.7}{3.9}$ A1 for 33.9 –33.93 SC B2 for 0.592(069…) or 37.6(923…) or 37.7
22 (a)	$\frac{12}{6.02\times10^{23}}$	1.99×10^{-23}	2	M1 for $\frac{12}{6.02\times10^{23}}$ A1 for 1.99×10^{-23} or better (1.99335…)
(b)	$\frac{100}{12}\times6.02\times10^{23}$	5.02×10^{24}	2	M1 for $\frac{100}{12}\times6.02\times10^{23}$ or $100\div$(a) A1 for 5.02×10^{24} or 5.03×10^{24} or better (5.0166…) ft from (a)
23	$\left(\frac{1}{2}\times\pi\times30^2+60\times45\right)\times90$ (1/2 × 2827.43+2700)×90 (1413.7..+2700)×90 4113.7.. × 90 = 370234.5…	370 000	4	**Cross-section approach:** M1 for $(\frac{1}{2}\times)\pi\times30^2$ (=2827.4 or 1413.7) or 60×45 (=2700) M1 for "$(\frac{1}{2}\times)\pi\times30^2$" + 60 × 45 (complete method) M1 for "*any* area" × 90 or 4110–4115 A1 for 370 000 to 370300 **Volume approach:** M1 for $(\frac{1}{2}\times)\pi\times30^2$ or 60×45 M1 for "$(\frac{1}{2}\times)\pi\times30^2$"×90 (=127234 or 254468) or 60 × 45 × 90 (=243000) M1 for addition of two volumes A1 for 370 000 to 370300 (370 235)

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No		Working	Answer	Mark	Notes
24	(i) (ii) (iii)		E A I	3	B1 for E cao B1 for A cao B1 for I cao
25	(a)	$\sqrt{75}$	8.66 or $5\sqrt{3}$	2	M1 for $\frac{3\times 50}{2}$ or 75 A1 for 8.66 or better (8.6602…, $5\sqrt{3}$)
	(b)	$d^2 = \frac{3h}{2}$	$\frac{2d^2}{3}$	2	M1 for squaring each side A1 for $\frac{2d^2}{3}$ oe