Edexcel GCSE

Mathematics A 1387
Paper 5523/03

June 2007

Mark Scheme

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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    If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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		Cuboid drawn	2	B2 for correct isometric drawing in any orientation (ignore points 'behind', mark 7 vertices only); accept lines drawn near to dots as long as there is no ambiguity. (B1 for one of the three faces drawn correctly **or** for an isometric drawing of any cuboid)
2	Different makes of car Tally Frequency	Make of car Tally Frequency	3	B1 for make of car or list of at least 3 different makes B1 for tally or tally marks B1 for frequency or totals
3		6 tessellating shapes	2	B2 for fully correct with 5 or more additional shapes, no gaps (B1 for 4 or more shapes tessellating, with at least one shape inverted, with or without the given shape, ignore extras)
4	$24.90 \div 3$ or 8.30 $24.90 - $ '8.30' or 2×8.30	16.6(0)	3	M1 for $24.90 \div 3$ or 8.30 M1 (dep) for $24.90 - $ "8.30" or $2 \times$ "8.30" A1 for 16.60 or 16.6

No	Working	Answer	Mark	Notes

5	315 24
	  24 315
	1260 120
	6300 240
	7560 7200
	      7560
	
	Lattice grid: 3 1 5 / 2 4 giving 0/6 0/2 1/0, 1/2 0/4 2/0, read off 7 5 6 0
	
	300 10 5
	6000 200 100 **20**
	1200 40 20 **4**
	
	6000+200+100+1200+40+20 = 7560
	
	3 0.1 0.05
	60 2 1 **20**
	12 0.4 0.2 **4**
	
	60 + 2 + 1 + 12 + 0.4 + 0.2 = 75.6
		75.6(0)	3	M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary.
				OR
				M1 for a complete grid with not more than 1 multiplication error, addition not necessary.
				OR
				M1 for sight of a complete partitioning method, condone 1 multiplication error, final addition not necessary.
				
				A1 for 7560 or digits 756(0)
				A1 (dep on M1, but not previous A1) for correct placement of decimal point.

No	Working	Answer	Mark	Notes
6	15 and 16 parts shaded Alternative 1 $\dfrac{3}{4} = 0.75$ or 75%, $\dfrac{4}{5} = 0.8$ or 80% Alternative 2 $\dfrac{3}{4} = \dfrac{15}{20}$, $\dfrac{4}{5} = \dfrac{16}{20}$	$\dfrac{4}{5}$ + reason	3	M1 for shading 15 parts for $\dfrac{3}{4}$ M1 for shading 16 parts for $\dfrac{4}{5}$ A1 (dep on M2) for selection of $\dfrac{4}{5}$ with correct shading Alternative 1 M1 for $\dfrac{3}{4} = 0.75$ or 75% M1 for $\dfrac{4}{5} = 0.8$ or 80% A1 (dep on M2) for selection of 0.8 or 80% or $\dfrac{4}{5}$ with correct decimals or percentages Alternative 2 M1 for $\dfrac{3}{4} = \dfrac{15}{20}$ oe M1 for $\dfrac{4}{5} = \dfrac{16}{20}$ oe A1 (dep on M2) for selection of $\dfrac{4}{5}$ or $\dfrac{16}{20}$ with equivalent fractions

No	Working	Answer	Mark	Notes
7	$5 \times 5 \times 6$	150	4	M1 for attempt at 1 division (e.g. 40 ÷ 8), may be implied by marks or number on one edge of diagram or by 5 or 6 seen M1 for attempt at 3 divisions (40÷8, 40÷8, 60÷10), may be implied by marks or numbers on diagram or by 5,5 and 6 seen. M1 (dep on 1st M1) for "5" × "5" × "6" A1 cao Alternatively M1 for $40 \times 40 \times 60$ **or** $8 \times 8 \times 10$ **or** 96000 or 640 seen M1 for $40 \times 40 \times 60$ **and** $8 \times 8 \times 10$ or 96000 **and** 640 seen M1 (dep on 1st M1) for "$(40 \times 40 \times 60)$" ÷ "$(8 \times 8 \times 10)$" A1 cao SC:B1 for dividing area of one carton face by area of corresponding box face if M0
8 (a)		$\dfrac{7}{20}$	1	B1 for $\dfrac{7}{20}$ oe
(b)	7 + 2 (or 20 − 11) are not lime flavour	$\dfrac{9}{20}$	1	B1 for $\dfrac{9}{20}$ oe
(c)		0	1	B1 for 0, zero or nought ($\dfrac{0}{20}$ gets B0)
9 (a)		$80x$	1	B1 for $80x$ (accept $80 \times x$, $x80$, $x \times 80$) seen
(b)		$95y$	1	B1 for $95y$ (accept $95 \times y$, $y95$, $y \times 95$) seen
(c)		$80x + 95y$	2	M1ft for adding "$80x$" and "$95y$" (algebraic expressions only) A1 for $80x + 95y$

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No		Working	Answer	Mark	Notes
10	(a)		40	1	B1 cao
	(b)		45	1	B1 for 42 to 48 (accept 3/4 hour)
	(c)	40×2 or $\dfrac{40}{30} \times 60$ or $40 \div \dfrac{1}{2}$	80	2	M1 for 40×2 or $\dfrac{40}{30}$ or $40 \div \dfrac{1}{2}$ A1 cao NB $\dfrac{40}{45} \times 60$ gets M0 A0
11	(a)	$3 \times 3 - 4 \times 2$ or $9 - 8$	1	2	M1 for substitution of 3 and 2 into expression or 9 and 8 seen A1 cao
	(b)	$-7 - 3 = -10$ $2 \times -10 = -20$ $-20 \div 4$	−5	3	M1 for substitution of 2 and −7 into p(q − 3) or sight of -20 or −14 − 6 M1 (dep) for "−20" ÷ 4 A1 cao SC: B1 for −10 seen if M0
12	(a)	<table><tr><td>6</td><td>8</td><td>9</td><td>7</td></tr><tr><td>7</td><td>8</td><td>5</td><td>9</td><td>6</td><td>3</td></tr><tr><td>8</td><td>1</td><td>3</td><td>1</td><td>7</td><td>1</td></tr><tr><td>9</td><td>0</td><td>1</td></tr></table>	<table><tr><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>7</td><td>3</td><td>5</td><td>6</td><td>8</td><td>9</td></tr><tr><td>8</td><td>1</td><td>1</td><td>1</td><td>3</td><td>7</td></tr><tr><td>9</td><td>0</td><td>1</td></tr></table>	3	M1 for unordered diagram (condone one error) A1 cao B1 for key (eg 6 | 7 = 67)
	(b)(i)		Explanation	2	B1 for '(order numbers and) select middle value' oe
	(ii)		79		B1 cao

No		Working	Answer	Mark	Notes
13	(a)		Reflection in y-axis	1	B1 for triangle with vertices at (-1, 1) (-3, 1) and (-1,4)
	(b)		Rotation by half turn about (0, 0)	2	B2 for triangle with vertices (-1, -1) (-3, -1) and (-1, -4) (B1 for half turn not about (0,0))
	(c)		Enlargement Scale factor 3 Centre (0, 0)	3	B1 for 'enlargement' B1 for 'scale factor 3' or 3 seen B1 for 'centre (0,0)' B0 for any combination of transformations
14	(a)		4560	1	B1 cao
	(b)		45.6	1	B1 cao
	(c)		2.4	1	B1 cao
15	(a)	$4a - 2a + 5b + b$	$2a + 6b$	2	B2 cao (B1 for $2a$ or $6b$ seen)
	(b)		$x(x-6)$	2	B2 cao (B1 for $x(ax+b)$ where a, b are numbers not equal to zero or $x - 6$ seen on its own, or part of an expression)
	(c)		$3x - 2x^3$	2	B2 cao (B1 for $3x$ or $2x^3$)
	(d)		$4x(3y+x)$	2	B2 cao (B1 for $2(6xy + 2x^2)$ or $4(3xy + x^2)$ or $x(12y + 4x)$ or $2x(6y + 2x)$ or $4x(\quad))$

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No		Working	Answer	Mark	Notes
16	(a)	$1 - (0.2 + 0.3 + 0.1)$	0.4	2	M1 for $1 - (0.2 + 0.3 + 0.1)$ A1 for 0.4 oe, accept $\frac{0.4}{1}$
	(b)	0.2×200	40	2	M1 for 0.2×200 A1 cao NB $\frac{40}{200}$ is M1 A0, 40 out of 200 is M1 A1
17	(a) (i)	$180 - 2 \times 25$	130	3	M1 for $180 - 2 \times 25$ A1 cao
	(ii)		Reason		B1 for mentioning isosceles and equal (or base) angles or equal sides and equal (or base) angles
	(b)	$180 - 95$	85	1	B1 cao
18	(a) (i)		7^5	3	B1 cao
	(ii)		7^4		B2 cao (B1 for sight of 7^5 or 7^{2+3} or 7×7^3 or $7^1 \times 7^3$ or $7^2 \times 7^2$ or 7^{2+3-1})
	(b)		$\frac{1}{2}$	1	B1 for $\frac{1}{2}$ or 0.5 or 2^{-1}
19	(a)		3×10^7	1	B1 cao
	(b)		0.002	1	B1 cao

No	Working	Answer	Mark	Notes
20		Box plot	2	3 aspects: 1st aspect – vertical line for median 2nd aspect – box using correct quartiles 3rd aspect – whiskers (could be single line) drawn with correct end points B2 for fully correct box plot (B1 for 1 aspect)
21 (a)	e.g. 2 | 126 3 | 63 3 | 21 | 7	$2 \times 3 \times 3 \times 7$	2	M1 for a systematic method of at least 2 correct divisions by a prime number oe factor trees; can be implied by digits 2, 3, 3, 7 on answer line. A1 for $2 \times 3^2 \times 7$ or $2 \times 3 \times 3 \times 7$
(b)	$2 \times 3 \times 7$	42	2	B2 cao (B1 for 6, 14, 21 or $2 \times 3 \times 7$)
22	$\dfrac{8}{3} \times \dfrac{5}{4} = \dfrac{8 \times 5}{3 \times 4} = \dfrac{40}{12}$	$3\dfrac{1}{3}$	3	B1 for $\dfrac{8}{3}$ oe improper fraction or $\dfrac{5}{4}$ oe improper fraction M1 (dep on B1) for multiplying numerator and denominator of "$\dfrac{8}{3}$" and "$\dfrac{5}{4}$" A1 for $3\dfrac{1}{3}$ oe mixed number or $\dfrac{10}{3}$ OR B1 for 1.25 and 2.67 or 2.66(…) M1 (dep on B1) for correct method of multiplication A1 for $3.\dot{3}$

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No	Working	Answer	Mark	Notes
23			2	M1 for a relevant pair of intersecting arcs A1 for line drawn within guidelines, at least 3cm in length, accept broken line [SC: B1 for line drawn within guidelines if M0]
24 (a)		$-1, 0, 1, 2, 3$	2	B2 cao (-1 each error or omission)
(b)(i)		$x \geq \dfrac{7}{2}$	3	M1 for $2x \geq 7$, condone use of $=$ sign or wrong equality A1 for $x \geq \dfrac{7}{2}$ oe as final answer SC:B1 for 3.5 or $\dfrac{7}{2}$ seen if M0
(ii)		4		B1 ft from $x \geq \text{``}\dfrac{7}{2}\text{''}$
25	$4x + 2y = 8$ $4x - 10y = 20$ $\overline{}$ $12y = -12$ $y = -1$ $4x + 2(-1) = 8$ $x = 2.5$	$x = 2.5$ $y = -1$	3	M1 for correct process to eliminate either x or y (condone one arithmetical error) M1 (dep) for substituting found value into either equation A1 for $x = 2.5$, $y = -1$ [SC: B1 for $x = 2.5$ or $y = -1$ if M0]

No	Working	Answer	Mark	Notes
26	Interior angle of hexagon = $180 - (360 \div 6) = 120$ $360 - (90 + 120)$	150	4	Alternative 1 M1 for $360 \div 6$ A1 for 60 M1 (dep on M1) for "60" + 90 A1 cao Alternative 2 M1 for $360 \div 6$ A1 for 60 M1 (dep on M1) for $360 - (2 \times$ "60" $+ 90)$ A1 cao Alternative 3 M1 for $(6 - 2) \times 180 \div 6$ A1 for 120 M1 (dep on M1) for $360 - (90 + $ "120") A1 cao
27 (a)		(16), 50, 82, 96, 100	1	B1 cao
(b)	Cumulative freq. diag. curve/ segments	Cum. freq graph	2	B1 for 4 or 5 points plotted correctly ± 1 full (2mm) square depending on sensible table (condone 1 addition error) B1 (dep) for points joined by curve or line segments provided no gradient is negative - ignore any part 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)	$100 - 42$	58	2	M1 (ft dep on graph being cf) for reading from graph at 18 or 19, can be implied by answer in range 40 to 46 A1 for answer in range 56 to 60 or ft for $100 - $ '42' ± 1 full (2mm) square