

Edexcel GCSE

Mathematics A 1387

Paper 5525/05

June 2007

advancing learning, changing lives

Mark Scheme

## 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 as 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) $1 - (0.2 + 0.3 + 0.1)$	0.4	2	M1 for $1 - (0.2 + 0.3 + 0.1)$ A1 for 0.4 oe, accept $\frac{0.4}{1}$
	(b) $0.2 \times 200$	40	2	M1 for $0.2 \times 200$ A1 cao NB $\frac{40}{200}$ is M1 A0, 40 out of 200 is M1 A1
2	$650 - 430 = 220$ 1 choc ice costs 110p $650 - 5 \times 110 = 100\text{p}$	50	3	M1 for $650 - 430$ or 220 or 110 oe seen M1 for $650 - 5 \times \frac{'220'}{2}$ or $430 - 3 \times \frac{'220'}{2}$ oe A1 for 50p or £0.50 or £0.5  <i>Alternative scheme</i> $2x + 5y = 650$ $2x + 3y = 430$ oe M1 for subtracting two simultaneous equations to eliminate $x$ (lollies)(2 or 3 terms correct) M1 for $650 - 5 \times 'y'$ or $430 - 3 \times 'y'$ oe A1 for 50p or £0.50 or £0.5  <i>Alternative scheme</i> M1 for $3 \times (2x + 5y = 650)$ evaluated and $5 \times (2x + 3y = 430)$ evaluated oe (5 or 6 terms correct) M1 for subtraction of equations to eliminate $y$ (choc ices)(2 or 3 terms correct ft) A1 for 50p or £0.50 or £0.5

## Paper 5525\_05

No	Working	Answer	Mark	Notes
3		question + response boxes oe	2	1 <sup>st</sup> aspect: One question (eg 'how long does it take you to travel to school?' or 'What time did you leave home to get to school?'); ignore other questions. 2 <sup>nd</sup> aspect: Response list (at least two), not overlapping. 3 <sup>rd</sup> aspect: Some mention of units (eg minutes) in either question or responses B2 for all three aspects, or B1 for just one aspects.
4	2 [(3×1) + (4×1)] +  (3×6) + (1×6) + (2×6) + (4×6) + (1×6) + (5×6)	110  cm <sup>2</sup>	4	M1 for attempt to find the area of one face M1 for at least 6 faces with intention to add A1 cao B1 (indep) for cm <sup>2</sup> (with or without numerical answer)
5	$\left(\frac{-6+4}{2}\right), \left(\frac{5+3}{2}\right)$	(-1, 4)	2	B2 cao [B1 for (-1,a) or (b,4) or (4,-1)]
6		Box plot	2	3 aspects:  1 <sup>st</sup> aspect – vertical line for median 2 <sup>nd</sup> aspect – box using correct quartiles 3 <sup>rd</sup> aspect – whiskers (could be single line) drawn with correct end points  B2 for fully correct box plot (B1 for 1 aspect)
7			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]

Paper 5525\_05

No	Working	Answer	Mark	Notes								
8	(a) e.g. <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">2</td> <td style="padding: 2px 5px;">126</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">3</td> <td style="padding: 2px 5px;">63</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">3</td> <td style="padding: 2px 5px;">21</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">7</td> </tr> </table>	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 or factor trees; can be implied by digits 2, 3, 3, 7 on answer line. A1 for $2 \times 3^2 \times 7$ or $2 \times 3 \times 3 \times 7$
2	126											
3	63											
3	21											
	7											
	(b) $2 \times 3 \times 7$	42	2	B2 cao (B1 for 6, 14, 21 or $2 \times 3 \times 7$ )								
9	(a)	-1,0,1,2,3	2	B2 cao (-1 each error or omission)								
	(b)(i)	$x \geq \frac{7}{2}$	3	M1 for $2x \geq 7$ , condone use of = sign or wrong equality A1 for $x \geq \frac{7}{2}$ or as final answer								
	(ii)	4		SC:B1 for 3.5 or $\frac{7}{2}$ seen if M0 B1 ft from $x \geq \frac{7}{2}$ or $x > \frac{7}{2}$								
10	(a)(i)	$7^5$	3	B1 cao								
	(ii)	$7^4$		B2 cao (B1 for sight of $7^5$ or $7^{2+3}$ or $7 \times 7^3$ 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 $2^{-1}$								

No	Working	Answer	Mark	Notes
11	(a) $5n = m + 21$	$n = \frac{m+21}{5}$	2	M1 for $5n = m + 21$ or for attempt to divide three terms by 5 A1 $n = \frac{m+21}{5}$ oe
	(b) $4p - 8q = 3p + 2$ $p - 8q = 2$ $p = 8q + 2$	$p = 8q + 2$	3	M1 for $4p - aq$ or $\frac{3}{4}p + b$ where $a$ is an integer and $b$ is a number M1 (dep) for taking one term correctly to LHS or RHS of expression A1 $p = 8q + 2$ oe
12		$y = \frac{1}{2}x + 3$	2	B2 for $y = \frac{1}{2}x + 3$ oe (B1 for $y = \frac{1}{2}x + c$ , $c \neq 7$ or $y = mx + 3$ oe or $\frac{1}{2}x + 3$ or $M = \frac{1}{2}x + 3$ )
13	$\frac{8}{3} \times \frac{5}{4} = \frac{8 \times 5}{3 \times 4} = \frac{40}{12}$	$3\frac{1}{3}$	3	B1 for $\frac{8}{3}$ oe or $\frac{5}{4}$ oe M1 (dep on B1) for multiplying numerator and denominator of " $\frac{8}{3}$ " and " $\frac{5}{4}$ " A1 for $3\frac{1}{3}$ oe mixed number or $\frac{10}{3}$  <i>OR</i> B1 for 1.25 and 2.67 or 2.66(...) M1(dep on B1) for correct method of multiplication A1 for 3. $\dot{3}$

No	Working	Answer	Mark	Notes
14	$4x + 2y = 8$ $4x - 10y = 20$ <hr style="width: 20%; margin-left: 0;"/> $12y = -12$ $y = -1$ $4x + 2(-1) = 8$ $x = 2.5$	$x = 2.5$ $y = -1$	3	<p>M1 for correct process to eliminate either <math>x</math> or <math>y</math> (condone one arithmetical error)</p> <p>M1 (dep) for substituting found value into either equation</p> <p>A1 for <math>x = 2.5, y = -1</math></p> <p>[SC: B1 for <math>x = 2.5</math> or <math>y = -1</math> if M0]</p>
15	<p>Interior angle of hexagon =</p> $180 - (360 \div 6) = 120$ $360 - (90 + 120)$	150	4	<p>Alternative 1</p> <p>M1 for <math>360 \div 6</math></p> <p>A1 for 60</p> <p>M1 (dep on M1) for “60” + 90</p> <p>A1 cao</p> <p>Alternative 2</p> <p>M1 for <math>360 \div 6</math></p> <p>A1 for 60</p> <p>M1(dep on M1) for <math>360 - (2 \times \text{“60”} + 90)</math></p> <p>A1 cao</p> <p>Alternative 3</p> <p>M1 for <math>(6 - 2) \times 180 \div 6</math></p> <p>A1 for 120</p> <p>M1(dep on M1) for <math>360 - (90 + \text{“120”})</math></p> <p>A1 cao</p>



No	Working	Answer	Mark	Notes
16	(a)	(16), 50, 82, 96, 100	1	B1 cao
	(b)	Cumulative freq. diag. curve/ segments Cum. freq graph	2	B1 ft for 4 or 5 points plotted correctly $\pm 1$ 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 $100 - '42' \pm 1$ full (2mm) square
17	(a)	0.6 and 0.7, 0.3, 0.7	2	B1 for 0.6 on LH branch B1 for 0.7, 0.3 and 0.7 on RH branches
	(b)	0.4 $\times$ 0.3 0.12	2	M1 for 0.4 $\times$ 0.3 A1 0.12 oe
	(c)	0.4 $\times$ 0.7 + 0.6 $\times$ 0.3 0.46	3	M1 for '0.4 $\times$ 0.7' or '0.6 $\times$ 0.3' M1 for addition of two products from correct branches A1 0.46 oe Alternative M2 for an attempt to evaluate $1 - (0.3 \times 0.4 + '0.6 \times 0.7')$ A1 cao
18	$x = 0.4545\dots$ so $100x = 45.4545\dots$ $99x = 45$ $x = \frac{45}{99} = \frac{15}{33}$	proof	3	M1 for $100x = 45.45\dots$ or $10000x = 4545.45\dots$ M1 (dep) for subtraction of both sides A1 for $\frac{15}{33}$ from correct proof

No	Working	Answer	Mark	Notes
19	$(\sqrt{3})^2 + \sqrt{3}\sqrt{2} - \sqrt{3}\sqrt{2} - (\sqrt{2})^2$ $= 3 - 2$	1	2	B2 cao (B1 for $\sqrt{3}\sqrt{3} + \sqrt{3}\sqrt{2} - \sqrt{3}\sqrt{2} - \sqrt{2}\sqrt{2}$ oe, $\sqrt{3}\sqrt{3} - \sqrt{2}\sqrt{2}$ oe, or for 2,3, $\sqrt{4}$ $\sqrt{6}$ $\sqrt{9}$ seen)
20	(a) $\frac{96}{24}$ or 4 $\sqrt{4}$ or 2	8	3	M1 for $\frac{96}{24}$ or $\frac{24}{96}$ or 4 or $\frac{1}{4}$ oe M1 for $\sqrt{\frac{96}{24}}$ or $\sqrt{\frac{24}{96}}$ or $\sqrt{4}$ or $\frac{1}{\sqrt{4}}$ or 2 or $\frac{1}{2}$ oe A1 cao
	(b) $12 \times 2^3$	96	2	M1 for '2' <sup>3</sup> or 8 A1 cao
21	(a) $x \times 3 - x \times 2x^2$	$3x - 2x^3$	2	B2 cao (B1 for a two term expression with either $3x$ or $2x^3$ )
	(b)	$4x(3y + x)$	2	M1 for taking out a factor of $x$ , $2x$ , $2$ , $4$ or $4x$ A1 cao
	(c) $\frac{5a}{b^2}$	$\frac{5a}{b^2}$	2	B2 for $\frac{5a}{b^2}$ or $5ab^{-2}$ (accept $\frac{5a}{1b^2}$ ) ( B1 for either dealing with the numbers or dealing with the powers of $a$ )
	(d) $\frac{\cancel{x-3}}{(\cancel{x-3})(x+3)}$	$\frac{1}{x+3}$	2	M1 for $(x-3)(x+3)$ A1 cao
22	(a)	<b>a + b</b>	1	B1 <b>a + b</b> oe
	(b) $ED = \mathbf{a}$ $DX = -2\mathbf{b} + 2 AC = 2\mathbf{a}$ (So, $DX = 2ED$ )	<b>2a</b>	3	M1 for $(DX =) DA + AX$ A1 for $(DX =) -2\mathbf{b} + 2$ (" <b>a + b</b> ") A1 <b>2a</b> from fully correct proof

## Paper 5525\_05

No	Working	Answer	Mark	Notes
23	$\pi(2x)^2 h = \frac{4}{3}\pi(3x)^3$ $h = \frac{\frac{4}{3}\pi(3x)^3}{\pi(2x)^2}$	9x	3	M1 for $\pi(2x)^2 h = \frac{4}{3}\pi(3x)^3$ (condone absence of brackets) M1 (dep) for valid algebra that gets to $h = ax$ (condone one error in powers of numerical constants) A1 cao
24	(i) $n^2 + (n+1)^2 = 2(n^2 + n) + 1$ (ii)	$2n^2 + 2n + 1$ $2(n^2 + n)$ is always even so $2(n^2 + n) + 1$ is always odd	4	M1 for at least 3 terms correct from $n^2 + n + n + 1$ A1 for $2n^2 + 2n + 1$ oe M1 for recognizing $2n^2$ is always even A1ft complete proof for their quadratic  <i>Alternative method</i> M1 for recognizing that if $n^2$ is odd then $(n+1)^2$ is even or vice versa A1 for complete proof
25		42 318	2	B1 for answer in range 36 – 48 B1 for answer in range 312 – 324
26	(a) $(x-3)^2 - 3^2 + 15$ (b)	$p = 3, q = 6$  Sketch	2  2	B2 for $p = 3$ and $q = 6$ (B1 for $p = 3$ OR $q = 6$ ) SC: award B2 for $(x-3)^2 + 6$ if $p$ <u>and</u> $q$ are not identified B1 for U shaped curve B1 ft for TP in first quadrant (ft if TP not in first quadrant)

## Paper 5525\_05

No	Working	Answer	Mark	Notes
27 (a)	Graph translated 2 units upwards through points $(-4, 2)$ , $(-2, 4)$ , $(0, 2)$ and $(3, 5)$	Sketch	2	M1 for a vertical translation A1 curve through points $(-4, 2)$ , $(-2, 4)$ , $(0, 2)$ and $(3, 5) \pm \frac{1}{2}$ square
(b)	Graph reflected in $x$ -axis through points $(-4, 0)$ , $(-2, -2)$ , $(0, 0)$ and $(3, -3)$	Sketch	2	M1 for reflection in $x$ -axis or $y$ -axis A1 curve through points $(-4, 0)$ , $(-2, -2)$ , $(0, 0)$ and $(3, -3) \pm \frac{1}{2}$ square