

GCSE

Edexcel GCSE

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 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)	$x^2 = \frac{108}{3}$	2	M1 ( $x^2 =$ ) $\frac{108}{3}$ (=36) or 36 seen
	(b)	$2 \times 54 = 2 \times 2 \times 27$	3	A1 cao 6 or -6 or both. Also accept $\sqrt{36}$ 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)		2	B2 all three correct (B1 one or two correct)
	(b)		2	B1ft points plotted correctly $\pm 1$ 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 $\pm 1$ full square depends on at least B1 in (b) (B1 for one value or line $y = 3$ seen)
3		$10.5 \times 5$	2	M1 $10.5 \times 5$ A1 cao
4		overlay	4	M1 quarter "circle" drawn centre A inside rectangle (ignore lines outside the rectangle) A1 radius 4 cm $\pm 2$ mm B1 line drawn 1 cm $\pm 2$ mm 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 $2000 \times 6$ or $2050 \times 6$ or $400 \times 30$ or $410 \times 30$ 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 127.49 or 127.49.... or 127.499									
8	How many pizzas have you eaten in the last week?		<table><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>More than 3</td></tr></table>							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
					0	1	2	3	More than 3								
9	(a)					$4.56 \times 10^5$	1	B1 cao									
	(b)					$3.4 \times 10^{-4}$	1	B1 cao									
	(c)					$1.6 \times 10^8$	1	B1 cao									
10	(a)					$(x + 2)(x + 4)$	2	M1 ( $x \pm 2$ )( $x \pm 4$ ) A1 cao									
	(b)					$-2, -4$	1	B1 ft from (a) or $-2, -4$									
11	(a)	SF = 1.5				39 cm	2	M1 SF = $\frac{12}{8}, \frac{8}{12}, 1.5, 0.6 \dots$ 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	200	1	B1 Reason or appropriate calculation
	(b) $\frac{240}{1.2}$		2	M1 $\frac{240}{1.2}$ oe A1 cao
14	(a)	12, 33, 69, 92, 100	1	B1 cao
	(b)	62- 64 hours	2	B1 ft for 4 or 5 points plotted correctly $\pm 1$ 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 . B1 62-64 otherwise ft from cumulative freq graph B1 for hours
	(c)		2	
15	(a)	90	2	B1 $90^{\circ}$ B1 angle in semi circle ( $= 90^{\circ}$ )
	(b) $70 \div 2$	$35^{\circ}$	2	B1 $35^{\circ}$ or $325^{\circ}$ B1 angle at centre = twice angle at circumference OR B1 angle on a straight line <i>with</i> isosceles triangle

Paper 5525_05				
No	Working	Answer	Mark	Notes
16	(a)	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)	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)	$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$		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)	$(y-1)^2 = \frac{9}{4}$ $y-1 = \pm \frac{3}{2}$	$y = \frac{5}{2}, -\frac{1}{2}$	3	M1 $(y-1)^2 = \frac{9}{4}$ 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 <b>and</b> area above 21 consistently 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 $2\text{mm}^2 = 1$ 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)	$16\sqrt{2}$	2	M1 ( $\sqrt{8} = \sqrt{4 \times 2}$ or $\sqrt{2} \times \sqrt{2} \times \sqrt{2}$ or $(2^3)^{\frac{3}{2}}$ A1 for $16\sqrt{2}$ (accept $m = 16$ )
	(d)	$\frac{\sqrt{2}}{32}$	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)		3	B1 for either $BC = CD$ or $BC = CE$ $CF = CE$ or $CF = CD$ B1 for $BCF = DCE = 150^\circ$ or correct reason
	(b)		2	B1 for proof of congruence B1 $BF = EG$ or $BF = ED$ B1 fully correct proof
22		$a = \frac{n^2 - nP}{P - 1}$	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 $ab = 6$ M1 for $(n-a)(n+a)$ seen A1 cao or M1 for $n^2 - 2an + a^2$ seen A1 cao
	(b)(i)	$(n-a)(n+a-(n-a))$ or $n^2 - a^2 - (n^2 - 2an + a^2)$		
	(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)	$y = f(-x)$	1	B1 cao
	(c)	Translation by + 2 parallel to the y axis	1	B1 for translation by $\begin{pmatrix} 0 \\ 2 \end{pmatrix}$