

GCSE

Edexcel GCSE

Mathematics A 1387

Paper 5525/05

Summer 2005

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Mark Scheme (Results)

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## 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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)	$x^2 - 4x + 7x - 28$	2	M1 for 4 terms correct ignoring signs (e.g $x^2, 4x, 7x, 28$ ) or 3 terms with correct signs (e.g $x^2, -4x, 7x, -28$ )
	(b)	$y^4 + 2y^2$	2	A1 cao B2 cao B1 for $y^4$ or $2y^2$
	(c)	$p(p+6)$	2	B2 for $p(p+6)$ or $p \times (p+6)$ (B1 for $p(ap+b)$ where $a, b$ are numbers or $p+6$ seen on it's own, or part of an expression)
	(d)	$3x(2x - 3y)$	2	B2 (B1 for $3(2x^2 - 3xy)$ or $x(6x - 9y)$ or $3x(\dots)$ )
2		question + response boxes oe	2	1 <sup>st</sup> aspect: One question with time period (eg each night); 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 hours) in either question or responses Award B2 for all three aspects, or B1 for just two aspects. * 0-1, 2-3, 4-5 is OK, but 0-1, 1-2, 2-3 is not OK.
3		reflection in $y = x$	2	B2 cao accept the word "reflected" (B1 any statement including the word "reflection")
4	(a)	$5 - 3x = 2x + 2$ $5 - 2 = 2x + 3x$	3	B1 for $2x + 2$ seen OR $2.5 - 1.5x = x + 1$ M1 for correct rearrangement of 4 terms A1 for $\frac{3}{5}$ oe
	(b)		2	B2 (B1 for 5 correct and not more than one incorrect integers)

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No	Working	Answer	Mark	Notes
5	(a) $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$	$\frac{1}{2}$	2	M1 for $\frac{6}{12}$ or $\frac{3}{6}$ or $\frac{2 \times 3}{3 \times 4}$ A1 accept 0.5
	(b) $1+2+\frac{8}{12}+\frac{9}{12}$	$4\frac{5}{12}$	2	M1 for attempt to convert to fractions with common denominator e.g two fractions, denominator of 12 A1 correct conversion : $\frac{8}{12}$ and $\frac{9}{12}$ , or $\frac{20}{12}$ and $\frac{33}{12}$ seen (oe) A1 cao for $4\frac{5}{12}$ OR attempts to convert to decimals: must use at least 2dp M1 0.66+0.75 (or 1.66+2.75) or 0.67+0.75 etc A1 4.41, 4.417, 4.416 or 0.41, 0.417, 0.416 or 0.42, 4.42 A1 4.416 ( <i>recurring</i> )
6	(a)(i)	$5^6$	1	B1 accept 15625, $5^{4+2}$
	(ii)	$5^3$	1	B1 accept 125, $5^{9-6}$
	(b) $x + y = 10$ and $x - y = 4$	$x = 7$ $y = 3$	3	M1 for either $x + y = 10$ or $x - y = 4$ A2 for both values correct [(A1 for one value correct) If M0, award B3 for both values correct or B2 for one value correct, otherwise B0] SC B2 for $x = 3$ or $y = 7$

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No	Working	Answer	Mark	Notes
7	$2 \times \frac{1}{2} \times 6 \times 8$ or 48 $8 \times 9 + 6 \times 9 + 10 \times 9$ or $72 + 54 + 90$	264 cm <sup>2</sup>	4	M1 attempt to find the area of one face; $\frac{1}{2} \times 6 \times 8$ or $(8 \times 9)$ or $(6 \times 9)$ or $(10 \times 9)$ or 72 or 54 or 90 or 24 or 48 M1 all five faces with an intention to add A1 cao numerical answer of 264 B1 (indep) cm <sup>2</sup> with or without numerical answer
8		$\frac{\pi ab^3}{3d}$ $3(c+d)^3$ $3\pi bc^2$	3	B3 (B1 for each one correct) Nb -B1 for each of the 4 <sup>th</sup> , 5 <sup>th</sup> , 6 <sup>th</sup> tick
9	(a) $x + 0.3 + 0.2 + x = 1$ (b) $0.3 \times 200$	0.25 60	2 2	M1 for $x + 0.3 + 0.2 + x = 1$ oe, or $0.5 \div 2$ A1 oe M1 $0.3 \times 200$ A1 cao Accept 60 out of 200 (in words) SC B1 for $\frac{60}{200}$
10	(a) (b)	$(-12) - 4 - 2 - (0) 8$ 5 points plotted accurately points joined with smooth curve	3 2	B3 for all correct [(B1 for each one correct) B1 $\pm 1$ full (2mm) square ft table if at least B1 awarded (all 5 points plotted) B1 ft for any smooth curve if previous B1 gained NB: curve must pass within 1 full square of the points
11		$m=3$ $n=5$	2	B1 for 3 B1 for 5 (B2 for $2^3 \times 5$ or $2 \times 2 \times 2 \times 5$ ) SC: award B1 only if $m=3, n=3$ , for $8 \times 5$ seen

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No	Working	Answer	Mark	Notes
12	$\frac{5 - -1}{-1 - 2} = -2$	$y = -2x + 5$	4	M1 for clear attempt to find gradient eg fraction with -1,5 in numerator, 2,-1 in denominator A1 for $-2$ cao B2 ft for $y = -2x + 5$ oe (eg $y = \frac{-6}{3}x + 5$ ) (B1 for $y = mx + 5$ or $-2x + 5$ or $y = -2x + c$ )
13	(a)	$\frac{1}{4}$ on LH branch $\frac{2}{3} \& \frac{1}{3} \& \frac{2}{3}$ on RH branches	2	B1 cao B1
	(b)	$\frac{3}{4} \times \frac{2}{3} + \frac{1}{4} \times \frac{1}{3} = \frac{6}{12} + \frac{1}{12}$	3	M1 for $\frac{3}{4} \times \frac{2}{3}$ or $\frac{1}{4} \times \frac{1}{3}$ from their tree diagram M1 for sum of two products A1 for $\frac{7}{12}$ oe
	(c)	$n = 21 \times 4$ or $\frac{1}{6} : \frac{1}{4}$ oe $\frac{1}{6} \times 84$ or $21 \times \frac{2}{3}$	3	M1 for either $\frac{1}{3} \times \frac{3}{4} \left( = \frac{1}{4} \right)$ or $\frac{2}{3} \times \frac{1}{4} \left( = \frac{1}{6} \right)$ from their tree diagram M1 for $21 \times 4 (=84)$ or $\frac{21}{3} \times 2$ A1 for 14 cao SC: B2 for 63 seen in fraction or ratio

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14	(a)(i) (ii) (b)  360 – 90 – 90 – "150" or 180 – "150"	150  30	2  3	B1 accept 150 or 210  B1 for angle at the centre is twice the angle at the circumference B1 identifies angle between radius and tangent as 90° (may be in working or on diagram) M1 360° – 90 – 90 – "150" A1 ft from (a)(i) excluding a negative answer Or B1 for 90 M1 for $2 \times (180 - 90 - \frac{150}{2})$ A1 ft from (a)(i) excluding a negative answer Or B3 for 180 – (a) SC: 180 – "210" can get B1 for 90° and/or B1 for "cyclic quadrilateral"
15	(a) (b) eg $x = 0.3939\dots$ so $100x = 39.3939\dots$ $99x = 39$ so $x = \frac{39}{99} = \frac{13}{33}$	0.2727...	1 3	B1 for 2.27 recurring or 0.2727.... oe or 0.273 M1 for $100x = 39.39\dots$ M1 dep for subtraction of both sides A1 for $\frac{13}{33}$ from correct proof <b>Alternative method</b> M1 for $13.000 \div 33$ M1 for remainders 31 and 13 A1 for 0.39 recurring SC: B1 for $\frac{39}{99}$



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16	(a) $d = kt^2$ $80 = k \times 4^2$	$d = 5t^2$	3	M1 for $d = kt^2$ or $d \propto t^2$ M1 sub $d=80$ and $t=4$ into their equation
	(b)	245	1	A1 for $d = 5t^2$ oe (cao) B1 ft from (a) using "k"
	(c) $45 = 5t^2$	3	2	M1 ft from (a) for substituting $d=45$ into their equation A1 for 3 cao (condone inclusion of $-3$ )
17	(a)(i)	(0, 9)	3	B1 cao
	(ii)	(8, 25)		B1 for $x = 8$ cao B1 for $y = 25$ cao SC: B1 for (25, 8)
	(b)		3	M1 for expansion of either set of brackets with at least 3 of 4 terms correct M1 for common denominator of 4 or multiplying through by 4 or reducing each numerator to a single term A1 for fully correct solution <b>Alternative method</b> M1 for $(5 - \frac{(x-8)}{2})(5 + \frac{(x-8)}{2})$ M1 for $(\frac{2 \times 5 - (x-8)}{2})(\frac{2 \times 5 + (x-8)}{2})$ A1 for $\frac{(18-x)(x+2)}{4}$

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No	Working	Answer	Mark	Notes
18	(a) $\frac{810\pi}{90\pi}$ or 9 $\sqrt{9}$ or 3	12	3	M1 for $\frac{810\pi}{90\pi}$ or 9 or $\frac{1}{9}$ or 1:9 oe M1 for $\sqrt{\frac{810\pi}{90\pi}}$ or $\sqrt{9}$ or 3 or $\frac{1}{3}$ or $\sqrt{9}:\sqrt{1}$ oe A1 cao SC:B1 for answer of 36
	(b) $3^3$ or 27 or 2700	$2700\pi$	2	M1 for "3" <sup>3</sup> or 27 or $(\sqrt{9})^3 : (\sqrt{81})^3$ oe or $9^3$ or 2700– A1 cao
19	(a)(i) (ii) (iii) $64^{-\frac{2}{3}} = \frac{1}{64^{\frac{2}{3}}}$ or $64^{-\frac{2}{3}} = (4^2)^{-1}$	1 8 $\frac{1}{16}$	1 1 2	B1 cao B1 cao M1 for knowing negative power is a reciprocal or power of $\frac{1}{3}$ root is a cube root A1 cao for $\frac{1}{16}$
	(b) $\sqrt{27} = \sqrt{9 \times 3}$ or $\sqrt{27} = 3\sqrt{3}$ or $\sqrt{27} = 3^{3/2}$	$\frac{5}{2}$ oe	2	M1 for $\sqrt{27} = \sqrt{9 \times 3}$ or $\sqrt{27} = 3^{3/2}$ A1 for $\frac{5}{2}$ oe (cao) <b>Alternative method</b> M1 for $9 \times 27 = 3^{2n}$ A1 for $\frac{5}{2}$ oe (cao)

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No	Working	Answer	Mark	Notes
20	(a)(i)	(90, 1)	2	B1 cao could be indicated on diagram
	(ii)	(180, 0)		B1 cao could be indicated on diagram
	(b)(i)	(45, 0)	2	B1 cao could be indicated on diagram
	(ii)	(90, -3)		B1 cao could be indicated on diagram
21	$\frac{1}{3}\pi x^2 h = \frac{4}{3}\pi(2x)^3$ $x^2 h = 4 \times 8x^3$	32x	3	M1 for substitution in correct formulae M1 (dep.) for correct unsimplified expression eg $h = \frac{\frac{4}{3}\pi(2x)^3}{\frac{1}{3}\pi x^2}$ oe or $h = 8x$ oe A1 for 32x cao
22	(a)	$2a - 2b$	2	B2 (B1 for either $\overline{OM}$ or $\overline{ON}$ or $-a - 2b + 3a$ SC: B1 for $2b - 2a$ )
	(b)	$\overline{XY} = 2a$ (hence parallel)	2	B1 for either $\overline{OX}$ or $\overline{OY}$ or $(\frac{1}{2}\overline{QR})$ B1 for $\overline{XY} = 2a$ or $\overline{YX} = -2a$

