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# GCSE

## Edexcel GCSE

## Mathematics A 1387

## Paper 5525/05

Summer 2005

advancing learning, changing lives

Mark Scheme (Results)

Edexcel GCSE
Mathematics A 1387
Paper 5525/05

accac QCA

cea Rewarding Learning

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

| Paper 5525/05 | | | | | |
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| **No** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) | $x^2 - 4x + 7x - 28$ | $x^2 + 3x - 28$ | 2 | M1 for 4 terms correct ignoring signs (e.g $x^2, 4x, 7x, 28$) or 3 terms with correct signs (e.g $x^2, -4x, 7x, -28$)<br>A1 cao |
| | (b) | | $y^4 + 2y^2$ | 2 | B2 cao<br>B1 for $y^4$ or $2y^2$ |
| | (c) | | $p(p+6)$ | 2 | B2 for $p(p+6)$ or $p \times (p+6)$<br>(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 $3x(...)$) |
| 2 | | | question + response boxes oe | 2 | 1st aspect: One question with time period (eg each night); ignore other questions.<br>2nd aspect: Response list (at least two), not overlapping.*<br>3rd aspect: Some mention of units (eg hours) in either question or responses<br>Award B2 for all three aspects, or B1 for just two aspects.<br>* 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"<br>(B1 any statement including the word "reflection") |
| 4 | (a) | $5 - 3x = 2x + 2$<br>$5 - 2 = 2x + 3x$ | $\frac{3}{5}$ | 3 | B1 for $2x + 2$ seen OR $2.5 - 1.5x = x + 1$<br>M1 for correct rearrangement of 4 terms<br>A1 for $\frac{3}{5}$ oe |
| | (b) | | $-3, -2, -1, 0, 1, 2$ | 2 | B2 (B1 for 5 correct and not more than one incorrect integers) |

| Paper 5525/05 | | | | | |
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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 $\frac{2\times3}{3\times4}$<br>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<br>A1 correct conversion : $\frac{8}{12}$ and $\frac{9}{12}$,<br>or $\frac{20}{12}$ and $\frac{33}{12}$ seen (oe)<br>A1 cao for $4\frac{5}{12}$<br>OR<br>attempts to convert to decimals: must use at least 2dp<br>M1 0.66+0.75 (or 1.66+2.75) or 0.67+0.75 etc<br>A1 4.41, 4.417, 4.416 or 0.41, 0.417, 0.416 or 0.42, 4.42<br>A1 4.416 (*recurring*) |
| 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 $x-y=4$ | $x=7$<br>$y=3$ | 3 | M1 for either $x+y=10$ or $x-y=4$<br>A2 for both values correct [(A1 for one value correct)<br>If M0, award B3 for both values correct or B2 for one value correct, otherwise B0]<br>SC B2 for $x=3$ or $y=7$ |

| Paper 5525/05 | | | | |
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| **No** | **Working** | **Answer** | **Mark** | **Notes** |
| 7 | $2\times\frac{1}{2}\times6\times8$ or 48<br>$8\times9+6\times9+10\times9$<br>or 72 +54 + 90 | 264<br>$cm^2$ | 4 | M1 attempt to find the area of one face;<br>$\frac{1}{2}\times6\times8$ or $(8\times9)$ or $(6\times9)$ or $(10\times9)$ or 72 or 54 or 90 or 24 or 48<br>M1 all five faces with an intention to add<br>A1 cao numerical answer of 264<br>B1 (indep) $cm^2$ 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)<br>Nb –B1 for each of the $4^{th}$,$5^{th}$,$6^{th}$ tick |
| 9 (a)<br>(b) | $x+0.3+0.2+x=1$<br>$0.3\times200$ | 0.25<br>60 | 2<br>2 | M1 for $x+0.3+0.2+x=1$ oe, or $0.5\div2$<br>A1 oe<br>M1 $0.3\times200$<br>A1 cao Accept 60 out of 200 (in words)<br>SC B1 for $\frac{60}{200}$ |
| 10 (a)<br>(b) | | $(-12)-4\quad-2\quad(0)\,8$<br>5 points plotted accurately<br>points joined with smooth curve | 3<br>2 | B3 for all correct [(B1 for each one correct)<br>B1 $\pm$ 1 full (2mm) square ft table if at least B1 awarded (all 5 points plotted)<br>B1 ft for any smooth curve if previous B1 gained<br>NB: curve must pass within 1 full square of the points |
| 11 | | $m$=3<br>$n$=5 | 2 | B1 for 3<br>B1 for 5<br>(B2 for $2^3\times5$ or $2\times2\times2\times5$)<br>SC: award B1 only if $m$=3, $n$=3, for $8\times5$ seen |

| Paper 5525/05 | | | | | |
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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<br>A1 for $-2$ cao<br>B2 ft for $y=\text{"}-2\text{"}x+5$ oe (eg $y=\frac{-6}{3}x+5$)<br>(B1 for $y=mx+5$ or , -2$x$+5 or $y=\text{"}-2\text{"}x+c$) |
| 13 | (a) | | $\frac{1}{4}$ on LH branch<br>$\frac{2}{3}$ & $\frac{1}{3}$ & $\frac{2}{3}$ on RH branches | 2 | B1 cao<br>B1 |
| | (b) | $\frac{3}{4}\times\frac{2}{3}+\frac{1}{4}\times\frac{1}{3}=\frac{6}{12}+\frac{1}{12}$ | $\frac{7}{12}$ | 3 | M1 for $\frac{3}{4}\times\frac{2}{3}$ or $\frac{1}{4}\times\frac{1}{3}$ from their tree diagram<br>M1 for sum of two products<br>A1 for $\frac{7}{12}$ oe |
| | (c) | $n=21\times4$ or $\frac{1}{6}:\frac{1}{4}$ oe<br>$\frac{1}{6}\times84$ or $21\times\frac{2}{3}$ | 14 | 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<br>M1 for $21\times4$ (=84) or $\frac{21}{3}\times2$<br>A1 for 14 cao<br>SC: B2 for 63 seen in fraction or ratio |

| Paper 5525/05 | | | | | |
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| **No** | | **Working** | **Answer** | **Mark** | **Notes** |
| 14 | (a)(i) | | 150 | 2 | B1 accept 150 or 210 |
| | (ii) | | | | B1 for angle at the centre is twice the angle at the circumference |
| | (b) | | 30 | 3 | B1 identifies angle between radius and tangent as 90° (may be in working or on diagram) |
| | | $360-90-90-"150"$ or $180-"150"$ | | | M1 $360^\circ-90-90-"150"$<br>A1 ft from (a)(i) excluding a negative answer<br>Or<br>B1 for 90<br>M1 for $2\times(180-90-"\frac{150}{2}")$<br>A1 ft from (a)(i) excluding a negative answer<br>Or<br>B3 for $180-$(a)<br>SC: 180 – "210" can get B1 for 90° and/or B1 for "cyclic quadrilateral" |
| 15 | (a) | | 0.2727… | 1 | B1 for 2.27 recurring or 0.2727…. oe or 0.273 |
| | (b) | eg $x = 0.3939\ldots$ so $100x = 39.3939\ldots$<br>$99x = 39$<br>so $x=\frac{39}{99}=\frac{13}{33}$ | | 3 | M1 for $100x = 39.39\ldots$<br>M1 dep for subtraction of both sides<br>A1 for $\frac{13}{33}$ from correct proof<br>**Alternative method**<br>M1 for $13.000\div 33$<br>M1 for remainders 31 and 13<br>A1 for 0.39 recurring<br>SC:B1 for $\frac{39}{99}$ |

| Paper 5525/05 | | | | | |
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| **No** | | **Working** | **Answer** | **Mark** | **Notes** |
| 16 | (a) | $d = kt^2$<br>$80 = k \times 4^2$ | $d = 5t^2$ | 3 | M1 for $d = kt^2$ or $d \propto t^2$<br>M1 sub $d$=80 and $t$=4 into their equation<br>A1 for $d = 5t^2$ oe (cao) |
| | (b) | | 245 | 1 | B1 ft from (a) using "k" |
| | (c) | $45 = 5t^2$ | 3 | 2 | M1 ft from (a) for substituting $d$=45 into their equation<br>A1 for 3 cao (condone inclusion of $-3$) |
| 17 | (a)(i)<br>(ii) | | (0, 9)<br>(8, 25) | 3 | B1 cao<br>B1 for $x = 8$ cao<br>B1 for $y = 25$ cao<br>SC: B1 for (25, 8) |
| | (b) | LHS $= \left(\frac{100 - (x^2 - 16x + 64)}{4}\right)$<br>$= \left(\frac{36 + 16x - x^2}{4}\right)$<br>RHS $= \left(\frac{36 - 2x + 18x - x^2}{4}\right) =$ LHS | | 3 | M1 for expansion of either set of brackets with at least 3 of 4 terms correct<br>M1 for common denominator of 4 or multiplying through by 4 or reducing each numerator to a single term<br>A1 for fully correct solution<br>**Alternative method**<br>M1 for $(5 - \frac{(x-8)}{2})(5 + \frac{(x-8)}{2})$<br>M1 for $(\frac{2\times5 - (x-8)}{2})(\frac{2\times5 + (x-8)}{2})$<br>A1 for $\frac{(18 - x)(x + 2)}{4}$ |

| Paper 5525/05 | | | | | |
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| **No** | | **Working** | **Answer** | **Mark** | **Notes** |
| 18 | (a) | $\frac{810\pi}{90\pi}$ or 9<br>$\sqrt{9}$ or 3 | 12 | 3 | M1 for $\frac{810\pi}{90\pi}$ or 9 or $\frac{1}{9}$ or 1:9 oe<br>M1 for $\sqrt{\frac{810\pi}{90\pi}}$ or $\sqrt{9}$ or 3 or $\frac{1}{3}$ or $\sqrt{9}:\sqrt{1}$ oe<br>A1 cao<br>SC:B1 for answer of 36 |
| | (b) | $3^3$ or 27 or 2700 | $2700\pi$ | 2 | M1 for "3"$^3$ or 27 or $\left(\sqrt{9}\right)^3$ : $(\sqrt{81})^3$ oe or $9^3$ or 2700–<br>A1 cao |
| 19 | (a)(i) | | 1 | 1 | B1 cao |
| | (ii) | | 8 | 1 | B1 cao |
| | (iii) | $64^{-\frac{2}{3}} = \frac{1}{64^{\frac{2}{3}}}$ or $64^{-\frac{2}{3}} = (4^2)^{-1}$ | $\frac{1}{16}$ | 2 | M1 for knowing negative power is a reciprocal or power of $\frac{1}{3}$ root is a cube root<br>A1 cao for $\frac{1}{16}$ |
| | (b) | $\sqrt{27} = \sqrt{9\times3}$ or $\sqrt{27} = 3\sqrt{3}$ or $\sqrt{27} = 3^{3/2}$ | $\frac{5}{2}$ oe | 2 | M1 for $\sqrt{27} = \sqrt{9\times3}$ or $\sqrt{27} = 3^{3/2}$<br>A1 for $\frac{5}{2}$ oe (cao)<br>**Alternative method**<br>M1 for $9\times27 = 3^{2n}$<br>A1 for $\frac{5}{2}$ oe (cao) |

| Paper 5525/05 | | | | | |
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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 | | $\frac{1}{3}\pi x^2 h = \frac{4}{3}\pi(2x)^3$<br>$x^2 h = 4 \times 8x^3$ | $32x$ | 3 | M1 for substitution in correct formulae<br>M1 (dep.) for correct unsimplified expression eg<br>$h = \frac{\frac{4}{3}\pi(2x)^3}{\frac{1}{3}\pi x^2}$ oe or $h = 8x$ oe<br>A1 for $32x$ cao |
| 22 | (a) | $\left(\overline{OM} =\right) \boldsymbol{a} + 2\boldsymbol{b}$ $\left(\overline{ON} =\right) 3\boldsymbol{a}$ or $\frac{6}{2}\boldsymbol{a}$<br>$\left(\overline{MN} =\right) -\boldsymbol{a} - 2\boldsymbol{b} + 3\boldsymbol{a}$ | $2\boldsymbol{a} - 2\boldsymbol{b}$ | 2 | B2<br>(B1 for either $\overline{OM}$ or $\overline{ON}$ or $-\boldsymbol{a} - 2\boldsymbol{b} + 3\boldsymbol{a}$<br>SC: B1 for $2\boldsymbol{b} - 2\boldsymbol{a}$ |
| | (b) | $\left(\overline{OX} =\right) 2\boldsymbol{a} + \boldsymbol{b}$ $\left(\overline{OY} =\right) \boldsymbol{b} + 4\boldsymbol{a}$<br>(½ $\overline{QR}$ =) $2\mathbf{a} - \boldsymbol{b}$ or (½ $\overline{RQ}$ =) $\boldsymbol{b} - 2\boldsymbol{a}$ | $\overline{XY} = 2\boldsymbol{a}$<br>(hence parallel) | 2 | B1 for either $\overline{OX}$ or $\overline{OY}$ or (½ $\overline{QR}$ )<br>B1 for $\overline{XY} = 2\boldsymbol{a}$ or $\overline{YX} = -2\boldsymbol{a}$ |