

GCSE

Edexcel GCSE

Mathematics B 1388

Paper 5538/ 19

Summer 2005

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

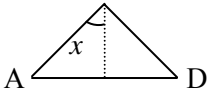
**9 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in a

| Paper 5538/19 |         |                                |      |   |
|---------------|---------|--------------------------------|------|---|
| No            | Working | Answer                         | Mark | Notes   |
| 1             | (a)     | $v - u = 5t$                   | 2    | M1 for isolating $\pm 5t$ or $\pm t$ or for dividing through by 5<br>A1 oe  |
|               | (b)     | $x - 3 = 5x - 25$<br>$22 = 4x$ | 3    | M1 for $x - 3 = 5(x - 5)$ or $\frac{x}{5} - \frac{3}{5} = x - 5$<br>M1 for isolating terms in $x$ correctly from $ax + b = cx + d$<br>A1 cao accept $5\frac{1}{2}$ , $\frac{11}{2}$ , 5.5   |
| 2             | (a)     |                                | 2    | B2 for 0.278326(699...)<br>(B1 for 3.5929)  |
|               | (b)     | 0.28 or 0.278                  | 1    | B1 ft for rounds to 2dp or 3 sf or 2sf  |
| 3             | (a)     | (10), 25, 55, 90,<br>115, 120  | 1    | B1 for all correct  |
|               | (b)     | graph                          | 2    | B1 ft for 5 or 6 plotted correctly $\pm 1$ full (2mm) square at end of interval dep. on sensible table (condone one addition error)<br>B1 (dep) for points joined by curve or line provided no gradient is negative – ignore any part of graph outside range of their points<br>(SC: B1 If 5 or 6 points plotted not at end but consistent within each interval and joined) |
|               | (c)     | 72 – 74                        | 2    | M1 (ft dep on graph being cf) for reading from graph at 7<br>A1 ft $\pm 1$ full (2 mm) square<br><b>OR</b> B2 for 72 – 74   |

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|---------------|---------|--|------|---|
| No            | Working | Answer   | Mark | Notes   |
| 4             | (a)     | Angle in a semicircle = $90^\circ$   | 1    | B1 oe   |
|               | (b)     | $12^2 + 16^2 = 400$<br>$\sqrt{400} = 20$   | 3    | M1 for $12^2 + 16^2$<br>M1 for $\sqrt{144 + 256}$<br>A1 cao   |
|               | (c)     | $\pi \times 10^2$<br><br>314   | 3    | M1 for $\pi \times \left(\frac{"20"}{2}\right)^2$<br><br>M1 (indep) for correct order of evaluation for $\pi \times r^2$ for any $r$<br>A1 for 314 – 315 inclusive          |
| 5             |         | $1.4 \times 10^{11}$   | 2    | B2 for $1.4 \times 10^{11}$ or $1.44 \times 10^{11}$<br>(B1 for $14.4 \times 10^{10}$ or 144000000000 or 140000000000 or $14 \times 10^{10}$ or $1.44^{11}$ or $1.4^{11}$ ) |
| 6             | (a)     | 4.5  | 1    | B1 cao  |
|               | (b)     | $500 \times 1.045^{20} = 1205.857\ldots$   | 2    | M1 for $500 \times 1.045^{20}$<br>A1 for 1205.85 – 1206<br>(SC:B1 for 705.85 – 706 no working)  |
| 7             |         | $84 = 6.7\pi + 2 \times 6.7 + 2a$<br>$2a + 13.4 = 62.95\ldots$<br>or $2a + 34.44 = 84$ | 3    | M1 for substituting correctly, $\pi$ may be left<br>M1 for correct rearrangement as far as $\pm 2a$<br>A1 for 24.7 – 24.8   |

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|---------------|--|--|------|--|
| No            | Working  | Answer                                 | Mark | Notes  |
| 8             | $6x^2 + 11x - 10 + 6x - 4 = 25$<br>$6x^2 + 17x - 39 = 0$ |  | 3    | M1 for an expression for the area involving either<br>$(3x - 2)(2x + 5) + 2(3x - 2)$<br>or $3x(3x - 2) + (3x - 2)(7 - x)$<br>or $3x(2x + 5) - 2(7 - x)$<br>or $(3x - 2)^2 + 2(3x - 2) + (3x - 2)(7 - x)$<br>where in each case at least one of 2 or 3 product terms must be correct<br>M1 (indep) for one correct expansion involving $x^2$<br>A1 for simplification to final answer |
| 9             |  | (i) = B, (ii) = C, (iii) = D, (iv) = A | 3    | B3 for all correct<br>(B2 for 2 correct, B1 for 1 correct)   |

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|---------------|--|-------------------------|-------------------|---|
| No            | Working  | Answer                  | Mark              | Notes   |
| 10            | <p>(a) <math>6^2 - 2^2 = 32</math></p> <p style="text-align: center;">V</p> <p>(b)</p> <p style="text-align: center;">V</p>  <p style="text-align: center;">A      D</p> <p><math>DVA = 2 \times \sin^{-1}\left(\frac{2}{6}\right)</math></p> <p>OR</p> $\cos DVA = \frac{6^2 + 6^2 - 16}{2 \times 6 \times 6}$ $= \frac{56}{72}$ $DVA = \cos^{-1}\left(\frac{56}{72}\right) = 38.94$ | <p>5.66</p> <p>38.9</p> | <p>2</p> <p>3</p> | <p>M1 for <math>6^2 - 2^2 (= 32)</math></p> <p>A1 5.65 – 5.66</p> <p>M1 <math>\sin x = \frac{2}{6}</math> oe</p> <p>M1 for <math>DVA = 2 \times \sin^{-1}\left(\frac{2}{6}\right)</math></p> <p>A1 38.9 – 38.95</p> <p>OR</p> <p>M1 for <math>(\cos DVA =) \frac{6^2 + 6^2 - 4^2}{2 \times 6 \times 6}</math></p> <p>M1 for <math>DVA = \cos^{-1}\left(\frac{56}{72}\right)</math></p> <p>A1 38.9 – 38.95</p> |

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|----------------|--|---|------|---|
| No             | Working  | Answer  | Mark | Notes   |
| 10 (c)         | $AC^2 = 2^2 + 2^2 - 2 \times 2 \times 2 \times \cos 120^\circ$<br>$AC = \sqrt{12}$<br><b>OR</b><br>$AN = 2 \times \sin 60 = \sqrt{3}$<br><b>OR</b><br>$VN = \sqrt{32 + 1} = \sqrt{33}$<br>$\cos AVC = \frac{6^2 + 6^2 - 12}{2 \times 6 \times 6}$<br>$\cos AVC = \frac{60}{72}$<br><b>OR</b><br>$AVC = 2 \times \sin^{-1} \frac{\sqrt{3}}{6}$ , using $AN$<br><b>OR</b><br>$AVC = 2 \times \cos^{-1} \frac{\sqrt{33}}{6}$ , using $VN$ | 33.6  | 4    | M1 for any valid method for $AC$ or $AN$ or $VN$ where $N$ is the midpoint of $AC$<br>A1 for $AC^2 = 12$ or $AC = \sqrt{12}$ ( $= 3.46\dots$ ) or $AN = \sqrt{3}$ ( $= 1.73\dots$ ) or $VN = \sqrt{33}$ ( $= 5.74\dots$ )<br>M1 (indep) for correct method to find angle $AVC$<br>A1 33.55 – 33.6 |
| 11 (a)         | $\frac{94}{567} \times 80$   | 13  | 2    | M1 for $\frac{94}{567} \times 80$<br>A1 cao   |
| (b)(i)<br>(ii) |  | equal chance of selection names out of a hat, etc | 2    | B1 for valid definition<br>B1 for valid method  |



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|---------------|---|---------------|------|--|
| No            | Working   | Answer        | Mark | Notes  |
| 12 (a)        | Graph translated 1 unit to the right passing through the points (-1,0), (1,2) and (2,0)           |               | 2    | M1 for translation of $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ or $\begin{pmatrix} -1 \\ 0 \end{pmatrix}$<br>A1 for right through 2 all 3 points, $\pm \frac{1}{4}$ sq                         |
| (b)           | Graph stretched 2 units parallel to y-axis; passing through the points (-2,0), (0,4) and (1,0)    |               | 2    | M1 for graph stretched parallel to the y-axis by scale factor 2<br>A1 through all 3 points; $\pm \frac{1}{4}$ sq not on grid at $x = 2$  |
| 13            | $3^4 x^4 y^8$   | $81x^4 y^8$   | 2    | B2 for $81x^4 y^8$<br>(B1 for 2 of 81, $x^4$ , $y^8$ )   |
| 14            | $\frac{\sqrt{18}+10}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{36}+10\sqrt{2}}{2}$ | $3+5\sqrt{2}$ | 2    | M1 for multiplying by $\frac{\sqrt{2}}{\sqrt{2}}$ or $\frac{\sqrt{2} \times 9 + \sqrt{2} \times 50}{\sqrt{2}}$<br>A1 for $p = 3$ and $q = 5$ or $3+5\sqrt{2}$<br>(SC:B1 for $p=3$ or $q=5$ ) |

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|---------------|--|--|------|---|
| No            | Working  | Answer   | Mark | Notes   |
| 15            | $x = 1 + 2y$<br>$(1 + 2y)^2 + y^2 + y^2 = 13$<br>$1 + 4y + 4y^2 + y^2 = 13$<br>$5y^2 + 4y - 12 = 0$<br>$(5y - 6)(y + 2) = 0$ | $y = -2, x = -3$<br>$y = 1.2 \text{ oe}, x = 3.4 \text{ oe}$ | 7    | B1 for $x = 1 + 2y$<br>M1 for subs. $x = 1 + 2y$ or $y = \frac{x-1}{2}$ into $x^2 + y^2 = 13$<br>M1 for expansion of $(1 + 2y)^2, \left(\frac{x-1}{2}\right)^2$ 3 out of 4 terms correct<br>A1 for $5y^2 + 4y - 12 = 0$ or $5x^2 - 2x - 51 = 0$<br>M1 for correct method to solve a 3 term quadratic equation<br>A1 for $y = -2$ and $y = 1.2$<br>A1 for $x = -3$ and $x = 3.4$<br>(SC: If no marks awarded<br>B1 for $x = -3$ and $y = -2$<br>or $x = 3.4$ and $y = 1.2$ ) |

