GCSE

Mathematics B (Linear)

General Certificate of Secondary Education

Component **J567/03:** Mathematics Paper 3 (Higher)

Mark Scheme for March 2013

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
✔	Correct
✘	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
⋀	Omission sign

These should be used whenever appropriate during your marking.

The **M**, **A, B**, etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.
It is vital that you annotate these scripts to show how the marks have been awarded.
It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

1. **M** marks are for <u>using a correct method</u> and are not lost for purely numerical errors.
    A marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
    B marks are <u>independent</u> of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
    SC marks are for <u>special cases</u> that are worthy of some credit.

2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is <u>not from wrong working</u> **full marks** should be awarded.

    Do <u>not</u> award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen <u>and</u> the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

    Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT 180 × (*their* '37' + 16), or FT 300 – √(*their* '5^2 + 7^2'). Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a).

    For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

    -   **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
    -   **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
    -   **nfww** means **not from wrong working**.
    -   **oe** means **or equivalent**.
    -   **rot** means **rounded or truncated**.
    -   **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
    -   **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7. In questions with a final answer line following working space,

   (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

   (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

   (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

8. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

9. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

10. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

11. Ranges of answers given in the mark scheme are always inclusive.

12. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

13. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part marks and guidance	
1	(a)		120　　180	2	Both correct **M1** for 300 ÷ (2 + 3) or 60 seen 　　or one correct Or **SC1** for 180　　120	
	(b)	(i)	52　　80　　132 68　　100　　168 120　　180　　300	1	**FT** *their* (a) All four values correct	**FT** only affects top line of table
		(ii)	$\dfrac{13}{30}$ or $\dfrac{52}{120}$ **oe isw**	2	**FT** *their* table **B1** for fraction with correct numerator or denominator seen	Full **FT** from *their* values in (b)(i)
		(iii)	11 : 14　final answer	2	**M1** for 　　132 : *their* '168' or better 　　Or for answer 14 : 11 **SC1** 13 : 17 or 4 : 5 as final answer	eg 66 : 84 **FT** *their* table for **M1** only
2	(a)		F = 3.5[0]n + 15 **oe** final answer	2	**M1** for 3.5[0]n seen or kn + 15 seen	Condone units given in formula or eg n3.5, 3.50 × n etc **M0** for F = 3.50 + 15 Condone any letter other than F in place of n for **M1**
	(b)		*Fresh Clean* by £4.5[0]	3	**M1** for [Cleanup] 25 × 1.5 + 10 **soi** And **M1** for [Fresh Clean] 3.5 × 8 + 15 **soi** 　　　　　　　　　　**FT** *their* (a) And **M1 FT** for correct answer to *their* '47.5' – *their* '43' with correct choice of company **max 2 marks if answer incorrect**	Implied by [£]47.5[0] seen Implied by [£]43 seen **FT** *their* formula in n
3	(a)		3a + a^2　final answer	1		Condone a×3 and a3 for 3a [not a^3]

Question			Answer	Marks	Part marks and guidance	
	(b)		$4(b-3)$ final answer	1	Accept $2(2b-6)$ as final answer	Condone missing final bracket
	(c)		$\dfrac{T-5}{4}$ or $\dfrac{T}{4}-1.25$ **oe** final answer	2	**M1** for $T-5=4p$ **oe** or $\dfrac{T}{4}=p+\dfrac{5}{4}$ **oe** Or **SC1** for answer $T-5\div 4$ or $\dfrac{T}{4}-5$ or $\dfrac{T+5}{4}$	
	(d)		$x<5$ final answer	3	**nfww** **M1** for collecting x terms or constants on one side $\quad 3x-x-6<4$ or $3x<x+4+6$ AND **M1 dep** for collecting constants or x terms on the other side $\quad 3x-x<4+6$ AND **M1** for $x<\dfrac{b}{a}$ after $ax<b$ seen **max 2 marks if answer incorrect** Or **SC2** for answer 5 or $x\ldots 5$ with any incorrect equality or inequality symbol or answer $3\times 5-6<5+4$	eg $3x-x<{}^-2$ implies **M1** $\quad 3x-6-4<x$ implies **M1** Dependent on first **M1** $2x<10$ implies **M2** $a\neq 1,\ b\neq 0$ Condone use of $=$ or incorrect inequality symbol for $<$ for all method marks
4	(a)		Linear scale on vertical axis Six heights correct [3, 4, 6, 8, 7, 2] Plots at midpoints and joined with straight lines	1 1 1	 **FT** *their* linear scale or implied linear scale if no scale indicated Condone one missing plot	Condone zero not marked, but scale must start from 0 Bar chart scores max **2** for scale and heights If frequency polygon and bar chart shown, mark best Ignore lines joining to origin or first point to last

Question			Answer	Marks	Part marks and guidance	
	(b)		9000 ≤ *s* < 10 000	1		Condone incorrect notation eg 9000 < *s* < 10000, 9000 – 10000 etc Condone slip in number of zeros eg 9000 < *s* < 1000 Do **not** accept answer 9000 ≤ *s* < 10 000 **and** 8 (choice)
	(c)		30	2	**B1** for 9 **and** 30 seen **SC1** for answer 70	For **B1** condone 28, 29, or 31 in place of 30
	(d)		7.5 or 7.499(99…) or 7.49̇	1		7.49 scores 0
5			11 36	4	**B3** for 11 or 36 in correct position or 11 and 36 positioned incorrectly OR **M1** for 3*n* + 3 **oe** seen AND **M1** for 6(*n* – 5) **oe** seen AND **M1** for *their* '3*n* + 3' = *their* '6(*n* – 5)' correctly simplified to *ax* = *b* **Alternative method** **M1** for trial with same start number correctly evaluating end number for both Leo and Kate AND **M1** for another trial with same start number and correctly evaluating end number for both Leo and Kate After **M0**, award **M1** for two starting numbers substituted correctly evaluating end number for Kate and/or Leo	Accept any letter used for *n* <table><tr><td>*n*</td><td>K</td><td>L</td><td></td><td>*n*</td><td>K</td><td>L</td></tr><tr><td>1</td><td>6</td><td>-24</td><td></td><td>11</td><td>36</td><td>36</td></tr><tr><td>2</td><td>9</td><td>-18</td><td></td><td>12</td><td>39</td><td>42</td></tr><tr><td>3</td><td>12</td><td>-12</td><td></td><td>13</td><td>42</td><td>48</td></tr><tr><td>4</td><td>15</td><td>-6</td><td></td><td>14</td><td>45</td><td>54</td></tr><tr><td>5</td><td>18</td><td>0</td><td></td><td>15</td><td>48</td><td>60</td></tr><tr><td>6</td><td>21</td><td>6</td><td></td><td>16</td><td>51</td><td>66</td></tr><tr><td>7</td><td>24</td><td>12</td><td></td><td>17</td><td>54</td><td>72</td></tr><tr><td>8</td><td>27</td><td>18</td><td></td><td>18</td><td>57</td><td>78</td></tr><tr><td>9</td><td>30</td><td>24</td><td></td><td>19</td><td>60</td><td>84</td></tr><tr><td>10</td><td>33</td><td>30</td><td></td><td>20</td><td>63</td><td>90</td></tr></table>Allow use of any value including negatives and non-integers

Question			Answer	Marks	Part marks and guidance	
6	**(a)**		Four equilateral triangles, correct size and position	2	**M1** for one correctly sized triangle Or for four triangles correctly placed	Use overlay, triangles should be correct by eye Ignore flaps
	(b)		96 – 100.8	4	**M1** for [height] 5.0 – 5.4 seen or **FT** measuring *their* triangle And **M1** for 0.5 × 6 × *their* height And **M1** for area of square base = 36 **soi**	**Answer nfww** This mark is for using area of a triangle formula, may be implied by 3 × *their* height *their* height is **FT** triangle drawn in (a), condone 6 for *their* height May be implied by 6 × 6 = 36 seen but not by 6 × 6 × 6 = 216 Condone use of Pythagoras with correct surds eg answer 36 (1 + $\sqrt{3}$) **oe** scores 4 **M1** for height $\sqrt{27}$ **oe** **M1** for 0.5 × 6 × $\sqrt{27}$

7	**(a)**		77.40	3	**M2** for 12.9 seen or **figs** 774 seen
					      or for attempt at 120% of 64.50 seen
					 OR
					 M1 for 6.45 seen or **figs** 129 seen
					      or for attempt at 20% of 64.50 seen
					
					 SC2 for answer 77.4
						eg 1.2 × 64.5 or 64.5 + $\frac{20}{100}$ × 64.5
						
						 eg 0.2 × 64.5

	(b)		21	3	**B2** for **figs** 121 or (1.1)^2 **oe soi** Or **B1** for 110[%] or 1.1 **oe soi**	May be implied by candidate appropriately increasing *their* suggested price, eg £20, £22, £24.20 seen implies **B2** Or £20, £22 seen implies **B1**

Question			Answer	Marks	Part marks and guidance	
8	(a)		30 final answer	2	**M1** for 360 ÷ 12 or 30 seen	
	(b)		150	1	**Or FT** 180 – *their* '(a)'	
9	(a)		(⁻5, 5.5)	2	**B1** for each value	
	(b)		$y = {}^-0.5x + 3$ **oe**	3	**M2** for [gradient =] ⁻0.5 **oe soi** OR **B1** for intercept = 3 **soi** AND **M1** for attempt to find gradient seen	Accept any equivalent three term equation eg implied by [$y =$] ⁻0.5x [+ k] seen eg implied by [$y =$] ax + 3 seen eg triangle with 5, 10 indicated in correct positions Or incorrect division using ±10 and ±5 Or gradient 0.5 or ±2 **soi**
10	(a)		$1\frac{1}{15}$ final answer	3	**M1** for $\frac{12}{5}$ or $\frac{9}{4}$ seen or equivalent improper fractions AND **M1** for *their* '$\frac{12}{5}$' × *their* '$\frac{4}{9}$' AND **M1** for *their* improper fraction correctly converted to mixed number in simplest form **max 2 marks if answer incorrect**	Answer $1\frac{3}{45}$ **oe** implies **M2**
	(b)		$\frac{1}{5}$ or 0.2	1		Condone 5^{-1}

Question			Answer	Marks	Part marks and guidance	
	(c)		5^9	1		
11	(a)		30 000	1		

	(b)		11 000	2	**M1** for 38 [000] or 27 [000] seen
					    or answer 11
					or **SC1** for answer 10 100
					      or answer 17 000
						[Consistent incorrect reading scale]
						[IQR of A]

	(c)		On average the salaries in Company B were higher than in Company A The salaries in Company A were more spread out than in Company B	1 1	For 2 marks at least one comment must refer to context ie salaries Award **B1** each for two valid worthwhile comments One comment about average, one about IQR or range **B0** if just statistics quoted and no explicit comparison	See exemplars Condone 'The ranges are the same' but word **range** must be used. Ignore irrelevant comments eg relating to number of employees
12	(a)		A, answer should have 5 zeros	1	Not enough zeros	See exemplars There must be more than just a calculation seen
	(b)		D, answer should be greater [than 5684]	1		See exemplars Assume their use of 'number' refers to 5684
	(c)		F, power [of 10 in answer] should be 6	1	Or 'subtract powers'	See exemplars
13	(a)		58°	1		
	(b)		122°	1	Or **FT** 180 – *their* '58'	

	(c)		29°	2	**M1** for
					reflex angle BOD = 360 – 116 [= 244]
					    Or ABD = 61 or OBD = 32
					    Or *their* '58' ÷ 2 **soi**
						For method marks the value must be linked with the correct angle, not just the number seen

Question			Answer	Marks	Part marks and guidance	
14	(a)		$12x + 4y = 10$ or $30x + 10y = 25$	M1	First step to equate coefficients eg by multiplying first equation 2 or 5	Allow other multiples, even fractional, eg **M2** for $6x - 7.5y = 24$
			$12x - 15y = 48$ or $8x - 10y = 32$	M1	Reaches equal coefficients eg by multiplying second equation by 3 or 2	Condone one error in each step for all **M** marks Mark best attempt
			$19y = {}^-38$ or $38x = 57$	M1	Correctly subtracting/adding to eliminate one unknown	Substitution method:
			$x = 1.5$ **oe** $y = {}^-2$	A1		**M1** for rearranging one equation to make x or y the subject **M1** for correct substitution into the other equation **M1** for rearranging *their* equation to $ax = b$ Condone one error in each step
					OR **SC2** for correct solution without algebraic working	

	(b)		$\dfrac{2}{3}$ **oe**, $-\dfrac{5}{2}$ **oe**	3	**M2** for $(3x - 2)(2x + 5)$ seen
					               or implied in table
					
					 OR
					 M1 for $(3x \pm 2)(2x \pm 5)$ seen
					   or pair of factors giving two correct terms
					    seen or implied in table
					 AND
					 B1 for correct solutions **FT** *their* quadratic factors
						Accept eg 0.66…, ${}^-2.5$ etc as equivalents, **isw** for incorrect conversion of fraction to decimal
						
						 eg $(6x - 1)(x + 10)$

15	(a)		12.5 **oe**	3	**M2** for $10 \times \dfrac{15}{12}$ **oe** Or **M1** for $\dfrac{15}{12}$ or $\dfrac{10}{12}$ **soi** Or **SC2** for answer 18	eg 1.25 or 4 : 5 or $\dfrac{12}{15}$ seen

Question			Answer	Marks	Part marks and guidance	

	(b)		∠ACB = ∠CAD, alternate angles
			
			∠ABC = ∠ACD = 80°,
			   angles in triangle ACD
			
			∠BAC = ∠CDA = 70°
			   angles in triangle ABC
				3	**B1** for two from ∠ACB = 30°, ∠ACD = 80° and ∠BAC = 70° **soi** and
					B1 for at least two correct pairs of angles stated (eg ∠ACB = ∠CAD)
					or for explicit statement that the angles in both triangles are 30, 80 and 70 and
					B1 for valid reasons for at least two angles stated
					
					max 2 marks if any incorrect reasons seen
						Angles may be seen marked on diagram
						
						Accept any valid alternative reasons

16	**(a)**		$\begin{pmatrix} 1 \\ 3 \end{pmatrix}$	1		Condone fraction lines in vectors throughout
	(b)		$\begin{pmatrix} 15 \\ -11 \end{pmatrix}$	2	**M1** for one correct component or for $\begin{pmatrix} 12 \\ -6 \end{pmatrix}$ seen	Condone missing brackets
17	**(a)**		Parabola through origin, inside given parabola	1		Clear intention Mark best attempt [other curve may be working for (b)]
	(b)		Translation $\begin{bmatrix} 0 \\ -3 \end{bmatrix}$	1 1	Condone 3 down	Accept translate, not move etc Not (0, –3)

Question	Answer	Marks	Part marks and guidance	
18	$3\sqrt{2}+1$	3	**B2** for answer $3\sqrt{2}+b$ **or** $a\sqrt{2}+1$ **OR** **M1** for attempt to multiply numerator and denominator by $\sqrt{2}$ AND **M1** for $\dfrac{6\sqrt{2}+\sqrt{2}\sqrt{2}}{2}$	$a \neq 0,\ b \neq 0$

19	$54 + 12\pi$	4	**M1** for $\dfrac{80}{360}$ **oe** seen
			 AND
			 M1 for *their* '$\dfrac{80}{360}$' $\times 2\pi r$ **oe**
			      or *their* '$\dfrac{80}{360}$' $\times \pi d$ **oe**
			
			 A1 for $r = 27$ or $d = 54$
			
			 AND
			 B1 for answer $2 \times$ *their* 'r' $+ 12\pi$
			      or *their* 'd' $+ 12\pi$
				eg 4.5 seen scores **M1**
				
				 Using *their* numerical r or d, from some working seen

20	307°, 233° only	2	**B1** for $360 - 53$ or $180 + 53$ **soi**	Implied by 307 or 233 seen Condone eg sin 233 for **B1**

Question			Answer	Marks	Guidance
21*			Fully correct method to find probability of winning with explanation of expected profit from game for a given number of entries with clearly expressed supporting method. Clear annotation and explanation of reasoning. Correct spelling, punctuation and grammar	5	eg Probability of winning = $\frac{1}{6} \times \frac{1}{5} + \frac{1}{6} = \frac{1}{5}$ Or probability of $\frac{6}{30} = \frac{1}{5}$ from listing For every £5 collected, £5 expected to be given in prizes, so no expected profit.
			Probability of winning = $\frac{1}{5}$ with clearly expressed supporting method and some attempt to use probability to compare expected takings with expected prizes OR Clear explanation comparing expected takings with expected prizes seen using probability = $\frac{1}{5}$ without clear working OR Clear explanation comparing expected takings with expected prizes using their incorrect probability with clearly expressed supporting method shown	4-3	For lower mark: Probability of winning = $\frac{6}{30}$ or $\frac{1}{5}$ (or equivalent decimal or percentage) with limited or no attempt to explain expected profit OR Attempt to compare expected takings with expected prizes using their incorrect probability
			Correct tree diagram or list of outcomes seen OR Correct probability in incorrect form (including other equivalent fractions) OR A correct probability found from their incorrect/incomplete selection of winning outcomes or probability of individual cards picked, not combined or combined incorrectly	2-1	For lower mark: Some relevant comment or calculation eg Attempt at list of outcomes of game OR one correct winning outcome clearly stated OR statement comparing possible takings with possible prizes
			No relevant calculation or comment seen	0	

APPENDIX

Exemplar responses for Q**11(c)**

Response	Mark
Company B has a smaller IQR than A making its results more consistent	**1**
Company B has a higher median of £33 000 rather than A with £30 000	**1** [use of £ counts as context]
The range of salaries is the same for company A and B	**1**
The average salary is larger for company B	**1** [salary sufficient context]
The range of results is the same	**1** [condone results]
Company B's median is higher so most of their salaries are higher than at company A's	**1**
Company B has a higher median salary at £33000 than company A at £30000	**1**
Company A has a high interquartile range at £17000 than company B at £11000	**1** [bod high not higher]
Company B has a better average interquartile range	**0** ['better' not sufficient]
Company A has a lower salary average	**1**
Company B has a larger median than company A	**1** [for first mark no context needed]
Company A lower quartile range is smaller than B	**0** [must compare IQR and neither in context]
Company B had a smaller interquartile range so therefore a higher salary	**1** [ignore end of sentence]
The lower and upper boundaries are the same	**0** [no 'range' also spread again]
They have the same lower and higher range	**0** [unclear]
£43000 is the range of salaries at both companies	**1** [range again: this one acceptable]
The interquartile range for company A is higher than that of company B	**1**
Company B has a higher mean salary	**0** [mean not known]
Company B is more consistent with the amounts of salary	**1**
Company A have a more unreliable salary but they both have the same amount of low salary and higher salary	**0** [also spread]
Company A on average makes less than company B	**0** [unacceptable, not about salaries]
One person in each company gets 10000 and one person in each gets 58000 – same range	**1** [for same range]
B has a higher average	**1**
Company As salaries stretches longer or is paid out in a longer amount of time compared to company B	**0** [unclear]
Company A had smaller salaries	**0** [no 'on average']
There is a bigger range in company A of salaries	**0**
Company B workers have a higher salary than company A	**0** [no 'on average']
Company A has a wider range of results	**0** [ranges same]
Company A has a lower quartile range	**0**
Company B has a higher upper quartile range	**0**

Exemplar responses for Q**12(a)**

Response	Mark
A, should be 100 times bigger	**1**
A, meant to have two more zeros	**1**
A, they have timesed 4000 by 3 instead of 3 hundred	**1**
A, 3 × 4000=12000 so the answer is too small	**1**
A Because e.g 3 × 4000=12000	**0** [needs further explanation]
A, the answer should have the same number of 0s in it as the question	**1** [just –correct for this question]
A because doesn't have enough zeroes	**1**
A because there are more zeroes on the left side	**1** [just]
A, because when you times hundreds by thousands you get hundred thousands	**1**
A because when timesing by tens, hundreds and thousands you always put all the zeroes at the end	**0** [unclear]
A, 4000 × 300 is too high to be 12 000	**0** [unclear]
A, if you were to multiply by 300 it would be 300 times bigger	**0**
A, there is less 0s	**0** [too vague]
A because there are seven digits in the initial numbers and only 5 in the answer	**0** [digits not zeros]
A, the zeros don't add up	**0** [too vague]
A, 300 × 4000 = 1200000	**0** [worked out correct answer]
A because the answer is too small	**0** [needs more]

Exemplar responses for Q**12(b)**

Response	Mark
D because dividing less than 1 makes the number bigger	**1**
D, if you divide by a decimal it get bigger	**1** [bod]
D because too low an answer	**1**
D, you would expect the number to be bigger	**1** [bod]
D, 5684 should increase not decrease	**1**
D, the number in the question is higher than the number in the answer	**1**
D, the number has decreased	**1** ['number' means 5684, just sufficient]
D because it is too high	**0**
D, 5684 ÷ 1 = 5684	**0**
D because multiplying by 0.96 the answer would be closer to 5684	**0**

Exemplar responses for Q**12(c)**

Response	Mark
F, the powers haven't been subtracted correctly	**1**
F, when you divide powers, you minus	**1**
F, $10^8 \div 10^2$ should be higher than 10^4 as you have to subtract	**1**
F because the powers of ten have been divided and not subtracted	**1**
F because when you divide powers you take one from the other	**1**
F because the power to 10 is dividing not subtracting	**1**
F because 8 – 2 is not 4	**1**
F because they have taken off too many powers	**1** [bod]
F, $10^8 \div 10^2$ doesn't equal 10^4	**1** [just]
F, the power has been divided like a number which is incorrect	**0** [too vague]
F because the powers are wrong	**0** [too vague]
F because the indices do not add up	**0**

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance
programme your call may be recorded or monitored

PART OF THE
CAMBRIDGE ASSESSMENT
GROUP

UKAS
MANAGEMENT
SYSTEMS

001