GCSE

Mathematics (9-1)

Unit **J560H/05:** Paper 5 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2017

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

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 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.   In questions with a final answer line:

   (i)   If one answer is provided on the answer line, mark the method that leads to that answer.

   (ii)   If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9.   In questions with no final answer line:

   (i)   If a single response is provided, mark as usual.

   (ii)   If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10.   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.

11. 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.

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

13. 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.

14. 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.

MARK SCHEME

Question			Answer	Marks	Part marks and guidance	
*1			$\dfrac{1}{11}$ final answer	2	**M1** for $\dfrac{30}{330}$ oe or correct cancelling shown After 0 scored, **SC1** for *their* fraction written in simplest form	For M1, condone 1 correct stage of cancelling common factors in numerators and denominators SC1 dep on a fraction that reduces
*2			64	3	**M2** for 160 ÷ 2.5 oe isw Or **M1** for 160 and 2.5 oe seen or for attempt at 160 divided by *their* time interval isw or for clear attempt to find gradient of line joining (09 00, 0) to (11 30, 160) or *their* dist divided by 2.5 oe isw	For M1, *their* time interval is in range 2 to 3 or 2h 30m or 1.5 or 3.5 accept 150 mins used

Question	Answer	Marks	Part marks and guidance	
*3	A - Yes with appropriate reasoning involving rounding and correct simplification to 3 : 8 or 3 :11 or 8 : 11 or ratios reversed OR B - Yes it is approximately correct oe and simplification of 6400 : 16200 to 32 : 81 OR C - Yes with a correctly evaluated calculation using e.g. ratio 3 : 8 with a comparison comment OR D - Yes and e.g. 16200 ÷ 8 **and** 6400 ÷ 3 correctly evaluated	3	**M2** eg for showing 6000 : 16000 and reducing to 3 : 8 or for appropriate rounding at some stage in correctly simplifying ratio leading to 3 : 8 isw or reduces 6400 : 16200 to 32 : 81 isw or reduces 6400 : 22600 to 32 : 113 isw or for ratio calculation leading to one of the following values seen 6075, 6163 to 6165, 16436 to 16440, 17066 to 17067 or 22275 or 23463 to 23467 seen isw or for 2025 **and** 2133 to 2134 seen isw or 2025 **and** 2054 to 2055 seen isw or 2133 to 2134 **and** 2054 to 2055 seen isw Or **M1** for 6000 or 16000 or 20000 or 22000 or 23000 seen or for appropriate rounding of one number at some stage in simplifying ratio or for intention to find $\frac{3}{8}$ of 16200 or for $\frac{8}{3}$ of 6400 or $\frac{3}{11}$ of (16200 + 6400) or $\frac{8}{11}$ of (16200 + 6400) isw or for 6400 ÷ 3 **and** one of 16200 ÷ 8 or (6400 + 16200) ÷ 11 seen isw or 16200 ÷ 8 **and** (6400 + 16200) ÷ 11 seen isw	For all marks accept method with equivalent fractions or decimals [3sf or better] Allow equivalent methods working with the totals e.g. 3 : 11, condone 22600 rounded to 22000 For 3 or M2, allow clear 'reverse' methods working from e.g. 3 : 8 to 6000 and 16000 Accept clear working if not in ratio form e.g. 3.2 and 8.1 shown not in ratio The figures in the part marks column are guidance on accuracy required for 3 marks or M2 SEE APPENDIX

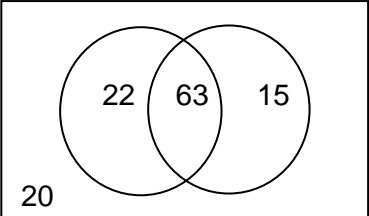| Question			Answer	Marks	Part marks and guidance	
4	(a)		1250	1		
	(b)		3	1		
	(c)		3rd graph indicated only	1		Accept any clear indication of correct graph
*5	(a)		$\dfrac{y+3}{7}$ or $\dfrac{-y-3}{-7}$ final answer	2	**M1** for $y + 3 = 7x$ or $\dfrac{y}{7} = x - \dfrac{3}{7}$ or for correct FT completion to answer after incorrect first step has been shown	For M1, accept the 'negative terms' versions
	(b)	(i)	$x(x-y)$ final answer	1		Condone omission of final bracket Condone $[1]x([1]x - [1]y)$
		(ii)	$(x+6)(x+2)$ final answer	2	**M1** for $(x + a)(x + b)$ where $ab = \pm12$ or $a + b = \pm8$ or for $x(x + 6) + 2(x + 6)$ seen or $x(x + 2) + 6(x + 2)$ seen	a, b integers For 2 marks, condone solutions after correct factors For 2 marks or M1, condone omission of final bracket
*6			69, 76, 76, 79	4	In any order **B3** for 4 values with a mode of 76 and a range of 10 OR **B1** for the sum of the 4 values is 300 soi **B1** for at least 2 values with a mode of 76 **B1** for a range of 10 for their given values	Mark final answer in working if answer line blank Integers only for all B marks Condone if 300 shown in working and then *their* final values do not sum to 300 May be from 2, 3 or 4 values on answer line May be from 2, 3 or 4 values on answer line

Question			Answer	Marks	Part marks and guidance	
*7	(a)		22 : 15	2	**M1** for any equivalent ratio or for two correct ratios with a common number of children seen implied by $22k$ and $15k$ seen ($k > 1$ and an integer) Or for $\frac{11}{3} : \frac{5}{2}$ or for 11 : 7.5	$15k : 22k$ implies M1 Accept 3.66 to 3.67 : 2.5
	(b)		258	3	**M2** for $\frac{36}{2} \times 5 + \frac{36}{3} \times 11$ [+36] oe or $((2 \times 11) + (3 \times 5)) \times 36 \div 6$ [+36] oe or $\frac{6}{6+15+22} \times x = 36$ oe or **M1** for $\frac{36}{2} \times 5$ or $\frac{36}{2} \times 7$ soi or $\frac{36}{3} \times 11$ or $\frac{36}{3} \times 14$ soi oe	M2 implied by 222 [+36] not spoiled 90 + 132 [+ 36] Implied by 90 or 126 or 132 or 168 seen
8	(a)		$360 \div 5$ **and** $360 \div 6$	**M1**	or for $((5 - 2) \times 180) \div 5$ oe **and** $((6 - 2) \times 180) \div 6$ oe	M1 allow $540 \div 5$ and $720 \div 6$ but not for just 108 and 120 Allow recovery of missing brackets from answers
			[Ext angle =] 72 **or** 60 seen	**B1**	or [Int angle =] 120 **or** 108 seen	nfww for B1 do not allow if e.g. 60 is shown as int angle of hexagon
			60 + 72 [= 132] or 360 – (108 + 120) [=132]	**A1**	with no errors seen	

Question			Answer	Marks	Part marks and guidance	
	(b)		[ext angle =] 180 − 132 oe or $\dfrac{180(n-2)}{n}$ = 132 oe	**M1**	Or [Int angle =] ((7 − 2) × 180) ÷ 7 oe	M1 implied by 48 or 128 to 129
			360 ÷ (180 − 132) oe soi Or for 360 ÷ 8 oe **and** 360 ÷ 7 oe Or for 48 × 7 **and** 48 × 8	**M1**	Or [Int angle =] ((8 − 2) × 180) ÷ 8 oe	M1 implied by 135 Division can be implied from a correct conclusion e.g. 360 is not a multiple of 48 gets M1A1 M1 Implied by 45 and 51 to 52
			No and correct conclusion	**A1**		e.g. explains that 360 ÷ 48 gives non - integer answer or 128 is 7 sided polygon and 135 is 8 sided polygon so No
*9			160 and assumed that sample of 50 is representative oe	**3**	**B2** for 160 or **M1** for $\dfrac{8}{50} \times 1000$ oe **AND** **B1** for assumed that sample of 50 is representative oe	Accept: Representative, not biased, random Ignore extra comments after correct comment given 　　　SEE APPENDIX
10	**(a)**		$x > 4$	**2**	**M1** for a correct first step e.g. 3x > 10 + 2, 3x − 12 > 0	For M1, condone wrong inequality symbol or equals

Question			Answer	Marks	Part marks and guidance	
	(b)		$\frac{3}{10}$ oe isw	3	**M1** for correct first step e.g. $6x + 4x + 2 = 5$ **M1** for $6x + 4x = 5 - 2$ or FT their $ax = b$ to $x = \dfrac{b}{a}$	Embedded answer scores M2 max If not shown, M1 implied by $\pm 10x = b$ or $ax = \pm 3$ e.g. M1 for $2x = 7$ leading to $x = \dfrac{7}{2}$ oe
11	**(a)**	**(i)**	Draws vector $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$	2	**B1** for each	In (a), penalise first instance only where direction arrow is omitted Condone good freehand mark intention
		(ii)	and Draws vector $\begin{pmatrix} 0 \\ 2 \end{pmatrix}$			Could be part of correct vector triangle
	(b)		They are different in direction oe	1	Accept correct comments that mention the directions of the vectors	Accept any comment implying the directions of the 2 vectors are different e.g. 'They are not parallel' 'They are going in different directions' 'They are going in opposite x–directions' 'Vector A is a [vertical] reflection of vector B' 'One goes left, the other goes right' 'One goes in positive direction the other goes in negative direction' 'One has –2 and the other has 2' Condone 'They are going in opposite directions' Do not accept mention of just 1 vector only unless the reason clearly implies a comparison e.g. Do not accept 'Vector **a** goes right' 'One of them has a minus sign'

Question			Answer	Marks	Part marks and guidance	
	(c)		-3	2	**M1** for $k\left(\begin{pmatrix}2\\1\end{pmatrix}-\begin{pmatrix}-2\\1\end{pmatrix}\right)=\begin{pmatrix}-12\\0\end{pmatrix}$ oe	M1 implied by answer $\begin{pmatrix}-3\\0\end{pmatrix}$
12			120	5	**M4** for $72 \div (0.5 \times 1.2)$ oe **Or** **M1** for $72 \div 0.5$ **A1** for 144 **M1** for *their* $144 \div 1.2$ **A1FT** for *their* $144 \div 1.2$ correctly evaluated	A1 implies previous M1 FT rot to integer, implies previous M1
13	(a)		$0.\dot{7}$	1		Condone poor notation e.g. $0.777...$, $0.\dot{7}\dot{7}$, 0.7^r
	(b)		35 [and] 11 or 70 [and] 22 final answer	3	**B2** for $\frac{315}{99}$ or $3\frac{18}{99}$ Or **B1** for $\frac{18}{99}$ Or **M1** for $318.18...$ or $18.18...$ seen	For 3 marks, accept in either order B2 implied by answer 315 and 99
14	(a)		$8 \times 6 \times 4$ [$= 192$]	1		Allow in stages
	(b)		No and shows 104	3	**M2** for $(8 \times 6) + (8 \times 4) + (6 \times 4)$ oe Or **M1** for any correct product seen oe isw	M1 implied by 48 or 24 or 32 seen
15	(a)	(i)	$6\sqrt{2}$ final answer	2	**M1** for $\sqrt{25 \times 2}$ or better seen	
		(ii)	$\dfrac{5\sqrt{6}}{3}$ final answer	2	**M1** for $\dfrac{10}{\sqrt{6}} \times \dfrac{\sqrt{6}}{\sqrt{6}}$ oe	For 2 marks accept $1\frac{2}{3}\sqrt{6}$

Question			Answer	Marks	Part marks and guidance	
	(b)		Identifies both errors **and** explains the correct steps e.g. Square not multiply by 2 oe negative power does not make answer negative it should be the reciprocal oe	2	**B1** for each with no incorrect statement for either	Accept implication of error by a description of correct step e.g. should be squared should be reciprocal, should be $1/n$, should be 1/64 Descriptions must be in words do not accept numeric examples alone
			$\dfrac{1}{16}$	1		SEE APPENDIX isw attempt to convert to decimal
16	(a)		104 <u>Angle</u> at <u>centre</u> is <u>twice</u> angle at <u>circumference</u>	2	**B1** for 104	With no incorrect statement Must use underlined terms. Accept reverse: <u>angle</u> at <u>circumference</u> is <u>half</u> angle at <u>centre</u> Accept arc for circumference but not edge
	(b)		128 <u>Opposite angles</u> in a <u>cyclic quadrilateral</u> [are supplementary oe]	2	**B1** for 128	With no incorrect statement Must use underlined terms Condone opp angles in cyclic quad = 180
17	(a)		$\dfrac{x+4}{x+1}$ final answer nfww	4	**M1** for $(x+4)(x-4)$ AND **M2** for $(x-4)(x+1)$ Or **M1** for $x(x+1) - 4(x+1)$ seen or $x(x-4) + 1(x-4)$ seen or for $(x+a)(x+b)$ where $a+b = -3$ or $ab = -4$	nfww please check working not just answer

Question			Answer	Marks	Part marks and guidance	
	(b)		4 and –60	2	**B1** for each	For 2 marks or B1, accept answers embedded in expression provided no contradiction seen
18			$\frac{22}{85}$ oe	5	isw conversion to other forms **M1** for (85 +78 +20) – 120 oe soi Or for 120 – 20 – 78 oe **B2FT** for correctly completed diagram with 85 – x, x [*their 63*], 78 – x, 20 correctly placed FT *their x* (can be algebraic or x is an integer 0 < x < 78) Or **B1FT** for attempt at Venn diagram with 85 – x or 78 – x or 20 correctly placed FT *their x* (can be algebraic or x is an integer 0 < x < 78) **B1** for $\frac{n}{85}$ or $\frac{22}{n}$ (both proper fractions) seen	For 5 marks accept 0.2588.. or 0.259 or 25.88…% to 25.9% M1 implied by 63 or 22 seen [Venn diagram: rectangle containing two overlapping circles with 22, 63, 15 and 20 outside] For B1, condone omission of rectangle for universal set
19	(a)		U shaped parabola with minimum value indicated at (2, –3)	3	**B1** for U shape curve **B1** for turning point at (2, k) **B1** for turning point at (k, –3)	Be generous for the U shape condone broken line Values must be shown but could be marked on axes. Mark intention Accept turning point = (2, –3) written in working provided no contradiction on sketch If point (2, –3) only plotted on graph and no sketch then B0B1B1

Question			Answer	Marks	Part marks and guidance	
19	(b)		4, 16, 12	5	**B4** for $a = 4$ and $b = 16$ **OR** **B3** for $c = 12$ and either $a = 4$ or $b = 16$ **OR** **M1** for $(x + 3)(x + 1)$ seen isw **A1** for $x^2 + x + 3x + 3$ or better seen isw **B1** for $c = 12$ **OR** **B1** for $c = 12$ soi **M1** for $(-1)^2 a - 1b + 12 = 0$ oe **and** $(-3)^2 a - 3b + 12 = 0$ oe	Alt method uses simultaneous equations with $c = 12$ Allow recovery for omission of brackets if negatives correctly dealt with
20			397.5 [million]	7	**B6** for [area of field =] 39.75 oe **OR** **B2** for [AC =] 13 or $\sqrt{169}$ Or **M1** for $5^2 + 12^2$ oe **M2** for ½×5×12 + ½×3×*their* 13×sin 30 oe Or **M1** for ½ × 5 × 12 oe or ½ × 3 × *their* 13 × sin 30 oe **B1indep** for sin 30 = 0.5 oe soi	For 7 marks, condone 397 500 000 For B6, accept $\dfrac{159}{4}$ or better for 39.75 Check diagram for B marks and M marks *their* 13 must be *their* AC written or indicated and is not 3, 5 or 12 M2 can be given for adding costs if correct total area method is implied [30] or [9.75 oe] 9.75 implies M1B1

Question			Answer	Marks	Part marks and guidance	
21	(a)		$2n$ is even and adding 1 gives an odd number oe	1	Must interpret the $2n$ as even or not odd and then the +1 giving odd oe	Accept '$2n$ is a multiple of 2' for $2n$ is even Accept 2 times any number is even oe for $2n$ is even (as n is defined as an integer in the stem of question) Accept 'next number' or 'odd' for +1 Do not accept e.g. $2n$ = even $2n$ +1 is odd (does not interpret the 1)
	(b)		$(2n + 3)^2 - (2n + 1)^2$ oe	M2	Allow $(2n + a)^2 - \{2n + (a \pm 2)\}^2$ where a is odd Or **M1** for $2n - 1$ or $2n + 3$ used with $2n + 1$ Allow $\{2n + (a \pm 2)\}$ used with $(2n + a)$ where a is odd	Could use alternate correct expressions for consecutive **odd** numbers. Allow M and A marks if correct. Could reverse the algebraic terms *their*$(2n + 1)^2 - (2n + 3)^2$ leading to $-8n - 8$, allow method and accuracy marks if correct. If brackets omitted allow recovery for M2 if correct expansion
			$4n^2 + 12n + 9 - 4n^2 - 4n - 1$	M2	**Dep on M2** for expanding brackets in *their* expressions. Or **M1indep** for one correct expansion of *their* brackets	If seen alone and completely correct then implies previous M2 Allow $4n^2 + 12n + 9 - (4n^2 + 4n + 1)$
			$8n$ or $8n + 8 = 8(n + 1)$ Or $8n + 8$ is a multiple of 8 oe	A1	With no errors or omissions seen. Correct for *their* two consecutive odd number expressions After **0** scored, Allow **SC1** for two correctly evaluated numeric examples of subtracting consecutive odd squares isw	Accept $-8n$ or $-8n - 8$ oe if subtraction is reversed NB: M2M1A1 not possible – must earn all method marks for A mark e.g. $7^2 - 5^2 = 24$ **and** $3^2 - 5^2 = -16$

APPENDIX

Exemplar responses for Q3

	Response	Mark
1	6400 : 16200 = 64 : 162 = 32 : 81 which is roughly 30 : 80 = 3 : 8 so yes	**3B**
2	6000 + 16000 = 22000, 22000 ÷ (3 + 8) = 2000 *Method C but better* 3 × 2000 = 6000 , 8 × 2000 = 16 000 so yes she is correct	**3C**
3	3.2 and 8.1 in working. Close as he can round the decimals to nearest whole number. *Decision not clear*	**M2B**
4	3 : 8 = 6 : 16 = 6000 : 16000 yes Katie is correct if she rounds to the nearest 1000 *Reverse method*	**3A**
5	16 200 ÷ 8 = 2040, 2040 × 3 = 6120 she is not correct *Error made in calculation M2 not available*	**M1C**
6	16 200 ÷ 8 = 2025, 2025 × 3 = 6075 which is close to 6400 so yes she is approximately correct	**3C**
7	16200 + 6400 = 22600, 22600 ÷ 11 =2540, 2540 × 3 *Intention to find 3/11 with errors*	**M1C**
8	16200 + 6400 = 22600 = 22000, 22000 ÷ 11 = 2000 *M1 for one correct rounding*	**M1D**
9	16200 ÷ 8 × 3 = 6075 No it is not correct *Correctly evaluated calculation with ratio 3 : 8*	**M2C**
10	16200 : 6400 = 81 : 32 = 8.1 : 3.2 which is approximately 8 : 3 so she is correct	**3B**
11	6000 ÷ 3 = 2000 and 16000 ÷ 8 = 2000 so yes *Equivalent to 4th the method but better*	**3D**
12	16000÷8 = 2000, 6400÷3 = 2138.3×11 = 23466. Approximately 400 off so No. *Error in calculation*	**M1C/D**
13	16200 × 3/8 =6075. No not correct as for ratio to be correct her loan would have to be £6075.	**M2C**
14	6400÷3 = 2133.33, 16200÷8 = 2025. Not correct as ratio parts are not equal.	**M2D**
15	16200 – 6400 = 9800, 9800 ÷ 5 × 3 = 5880 No	**M2C**
16	6400 × 8 = 51200, 16200 x 3 = 48600 No they are different	**M2C**

Exemplar responses for Q9

Answer should refer to sample and imply the sample asked was random/representative
Accept answers that refer to the proportions for 1000 being the same as the sample oe

	Response		Mark
1	Assume he asked males and females	*Implies sample should be representative*	**1**
2	He did not just ask one age group	*Implies sample should be representative*	**1**
3	His sample is random		**1**
4	The sample is reliable for other customers		**1**
5	He used stratified sampling meaning it was in proportion		**1**
6	It stays in the same proportion		**1**
7	Assuming the other people say the same		**1**
8	Everyone has the same style as the people in the survey		**1**
9	I assume that the trend in his table would carry on for the next 1000 shoes.		**1**
10	I made the assumption that his other customers buy the same as the customers he sampled		**1**
11	50 customers represent the same as what 1000 customers want		**1**
12	For every 50 customers the variation is constant		**BOD1**
13	I assumed the number of people choosing sandals would remain the same		**BOD1**
14	He asked his consistent regular reliable customers		**BOD 1**
15	He only asked people visiting the shoe shop to answer his survey	*This does not address the sample issue – they are all his customers*	**0**

16	Because for every customer's choice 20 pairs should be bought.	**0**
17	He only sampled 50 people so the results might not be accurate.	**0**
18	The same customers came in	**0**

Exemplar responses for Q15b

Accept reciprocal or one over for description of negative power, must use squared. Descriptions must be in words

	Response	Mark
1	Make the fraction reciprocal *(Not clear as the fraction could be the index)*	0
2	Negative power means find the inverse	0
3	Make it a reciprocal	1
4	The negative power makes it positive	0
5	Make it one over	1
6	He multiplied the power by 2	0
7	Need to turn into fraction ; The negative makes it a fraction	0
8	The –2 is the power so it must be squared	1
9	Square not times 2	1
10	Cube root should be squared and the negative power is 1 under *'1 under' is not quite right*	1, 0
11	Top fraction is to square not double, and the negative makes it 1 over	1, 1
12	Negative powers don't make negative numbers. *Need to describe corrective step*	0
13	It is not × 2, it is to the power of 2 *No – must say 'square'*	0