

GCSE

Mathematics B (Linear)

Component **J567/02**: Mathematics Paper 2 (Foundation)

General Certificate of Secondary Education

Mark Scheme for June 2014

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




All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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1. Annotations used in the detailed Mark Scheme.

| Annotation | Meaning |
|---|--|
|  | Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response. |
|  | Correct |
|  | Incorrect |
|  | Benefit of doubt |
|  | Follow through |
|  | Ignore subsequent working (after correct answer obtained), provided method has been completed |
|  | Method mark awarded 0 |
|  | Method mark awarded 1 |
|  | Method mark awarded 2 |
|  | Accuracy mark awarded 1 |
|  | Independent mark awarded 1 |
|  | Independent mark awarded 2 |
|  | Misread |
|  | 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 using a correct method and are not lost for purely numerical errors.

A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.

B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.

SC marks are for special cases 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 not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and 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 $180 \times (\textit{their '37' + 16})$, or FT $300 - \sqrt{(\textit{their '5^2 + 7^2'})}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their (a)}$.

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.

| Question | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|--|-------|-------------------------|--|
| 1 | (a) | Tue[sday] | 1 | | Allow -5 with Tuesday on the answer line |
| | (b) | 5, 2, 1, 3, 4 | 1 | | |
| | (c) | 8 | 1 | | |
| 2 | (a) | C | 1 | | Accept lower case in all parts |
| | (b) | A | 1 | | |
| | (c) | B and H | 1 | | |
| | (d) | E | 1 | | |
| | (e) | D and F | 1 | | |
| 3 | (a) | 3 | 1 | | |
| | (b) | (i) 14 22 or 2.22 pm | 1 | | accept 14.22 or 14:22 or 1422 [pm] etc |
| | | (ii) 64 or 1 h[our] 4 (minutes) | 1 | | do not accept 1.04 or 1.4 |
| | (c) | 1 (hour) 57 (minutes) or 117 (minutes) | 1 | Mark final answer | Do not accept 117 hours |
| | (d) | 13 05 or 1.05 pm | 1 | | accept 13.05 or 13:05 or 1305 [pm] etc |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|-------|-----------|-------|---|--------------------|
| 4 | (a) | (i) | 24 | 1 | | |
| | | (ii) | 25 | 1 | | |
| | | (iii) | 27 | 1 | | |
| | | (iv) | 23 | 1 | | |
| | (b) | | 21 and 28 | 1 | | |
| 5 | (a) | (i) | 7% | 1 | | accept 7 |
| | | (ii) | 273 | 2 | Mark final answer M1 for 0.65×420 oe or 10% (of 420) = 42 (must be correct) and attempts to find $42 \times 6 + 42 \div 2$ oe or 50% (of 420) = 210 (must be correct) 10% (of 420) = 42 (must be correct) $5\% = 42 \div 2$ and then adds these three results | Do not accept 273% |
| | (b) | | 336 | 2 | Mark final answer M1 for $96 \div 20 \times 70$ oe or 48 seen | Do not accept 336% |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|------|---|-------|--|--|
| 6 | (a) | (i) | sphere | 1 | | |
| | | (ii) | cylinder | 1 | | |
| | (b) | | Two correct rectangles (only), 4×1 and 4×3 drawn in an appropriate position | 2 | <p>M1 drawing 4×1 and 4×3 rectangles in any position (may be more than one of each), with no other different sized rectangles or 4×4 rectangle drawn with no other rectangle Or SC1 correct net drawn with tabs</p> | Use overlay Lines don't need to be straight |

| Question | Answer | Marks | Answer |
|----------|---|---|---|
| 7* | <p>All 3 correct perimeters given (with no extras) with a full method (showing calculations) and including units</p> <p>3 correct different perimeters (ignore units or extras) without a full method or no method or gives 2 correct different perimeters (ignore units or extras) with some method (showing correct rectangles sufficient for method)</p> <p>1 correct perimeter (ignore units or extras) with no method Do not accept Perimeter = 18cm^2 on its own with no method or shows at least 2 factor pairs of 18 or at least 2 different rectangles (with integer sides) with area 18cm^2</p> <p>Shows no relevant working</p> | <p>5</p> <p>4 – 3</p> <p>2 – 1</p> <p>0</p> | <p>2 correct different perimeters (ignore units or extras) with no method or gives 1 correct perimeter (ignore units or extras) with some method (showing correct rectangle sufficient for method here)</p> <p>shows 1 factor pair of 18 or any rectangle with area 18cm^2 or shows the correct method for finding any perimeter of a rectangle, ignore units or $P = 2a + 2b$ oe seen</p> <p>Rectangles do not need to be scale drawings, they may be sketches with the length of the sides shown</p> |

| |
|---|
| <p>Correct perimeters</p> <p>18 cm by 1 cm – Perimeter = 38 cm</p> <p>9 cm by 2 cm – Perimeter = 22 cm</p> <p>6 cm by 3 cm – Perimeter = 18 cm</p> |
|---|

| Question | | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|------|---|------------|---|---|
| 8 | (a) | | | 1 | | Must have 4 'squares' and 14 'dots' how these are set out is not relevant |
| | (b) | | Squares 1 2 3 4 5 Circles 8 10 12 14 16 | 1 | | |
| | (c) | | 26 | 1 | | |
| | (d) | (i) | [+] 6 | 1 | | |
| | | (ii) | 306 | 1 | FT 300 + <i>their</i> (d)(i) | |
| 9 | (a) | | 6 | 2 | M1 for [205 -121] = 84 seen or 196.(...) seen | |
| | (b) | | 177 | 2 | M1 for 4 x 14 soi | |
| | (c) | | $G = \frac{C - 121}{14}$ | 1 | | |
| 10 | (a) | (i) | 46.5 to 48 | 1 | | Answer may be seen on the graph |
| | | (ii) | 42 | 1 | | Answer may be seen on the graph |
| | (b) | | 171 –176 Acceptable explanation | 1 1 | Explanation can earn a mark even if answer not in correct range but any references to conversions need to be reasonable | see exemplars Reasonable conversions would be £10 between 11 and 19 \$ £50 between 71 and 80 \$ 60 between 91 and 99 \$ etc |

| Question | | | Answer | Marks | Part Marks and Guidance |
|----------|-----|------|---|--------|--|
| 11 | | | $14x + 2y$ or $2(y + 7x)$ | 3 | <p>M2 for $6x + 2x + 4x + x + y + x + y$ or better Or M1 for $4x$ or $x + y$ seen on the appropriate length on the diagram $6x + 2x + x + y$ or $x + y + x + y$ or $12x$ or $4x$ or $9x$ or $10x$ or $13x$ or $14x$ or $2y$</p> <p>unsimplified expression that would lead to the correct answer isw after any M1 awarded these expressions may be seen as part of expressions in their working or on the answer line Do not accept $9x \times y$ etc</p> |
| 12 | (a) | (i) | W[est] | 1 | Accept East to West |
| | | (ii) | 31 to 34 | 2 | M1 for 6.2 to 6.7 or 62 to 67 May be on the diagram |
| | (b) | | 070 (± 2) | 1 | condone 70 (± 2) ignore compass directions given with the correct bearing |
| | (c) | | Correct distance - 6 cm (± 0.2 cm) Correct bearing - 50° ($\pm 4^\circ$) | 1 1 | Measure distance Use overlay for bearing Line must be ruled and must be from Buoy2 |
| 13 | | | 192 | 3 | <p>M2 [$3/8 + 1/8 =$] $1/2$ soi Or M1 for four eighths seen</p> <p>Accept equivalent decimals or percentages, percentage sign must be seen</p> |

| Question | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|---|-------------------|---|--|
| 14 | | 2, 6, 8, 8, 11 (in any order) | 3 | <p>M2 for two of the following:</p> <ul style="list-style-type: none"> • Smallest number 2 • Two or three 8s • Numbers add up to 35 <p>Or</p> <p>M1 for one of the above</p> <p>Or</p> <p>SC1 (if four numbers given) for 2, __, __, __, 11 (in order)</p> <p>or</p> <p>__, 8, 8, __, __ (in any order)</p> | <p>Five numbers must be given for M2 and M1</p> <p>2 in first space and 11 in fifth space</p> <p>at least two eights</p> |
| 15 | | <p>Correct Pie Chart with sector angles 180°, 84°, 60°, 36° ($\pm 2^\circ$)</p> <p>Correct labelling</p> | <p>3</p> <p>1</p> | <p>3 or 4 angles correct</p> <p>M2 for 2 sectors correct</p> <p>Or</p> <p>M1 for 1 sector correct or 180, 84, 60, 36 all seen</p> <p>Correctly labelling <i>their</i> pie chart with four sectors, may use a key</p> | <p>Ignore labelling when measuring sectors</p> <p>Labelling must be consistent with the original data, E>SS>ES>OS Condone abbreviations</p> |
| 16 | (a) | 2/3 or 4/6 or 8/12 or 0.66(...) or 0.67 or 66% or 67% | 1 | isw | Accept a correct fraction with 'likely' on the answer line |
| | (b) | C | 1 | | Accept lower case in all parts Accept 5 red 2 yellow |
| | (c) | E | 1 | | Accept 14 red, 6 yellow |
| | (d) | B | 1 | | Accept 9 red, 6 yellow |

| Question | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|---|-------|---|---|
| 17 | (a) | Triangle A vertices (1, 1), (4, 1), (4, 2) | 1 | | Accept freehand in both parts Does not need to be labelled |
| | (b) | Triangle B vertices (-2, 5), (-2, 6), (-5, 6) | 2 | B1 for translation of correct B | Does not need to be labelled |
| 18 | (a) | 7.36 | 2 | Mark final answer M1 for $0.5 \times 4.6 \times 3.2$ oe | |
| | (b) | 52.5 | 2 | Mark final answer M1 for $\frac{1}{2} \times (9 + 12) \times 5$ oe | |
| 19 | (a) | 2.92 | 2 | Mark final answer B1 for 2.9[...] seen Or for <i>their</i> answer to more than 3sf correctly rounded to 3sf | Both unrounded and rounded value must be seen |
| | (b) | (i) | 1 | Or comment using[60 minutes in hour] not 100 minutes Accept answer is 2 hours 15 minutes | see exemplars for alternative acceptable answers Award 0 if any incorrect statement |
| | | (ii) | 1 | Or dividing by number < 1 so answer should be bigger | see exemplars for alternative acceptable answers |

| Question | | Answer | Marks | Part Marks and Guidance | |
|----------|-----|--|-------|---|---|
| 20 | (a) | 0.4 0.36 0.38 oe | 2 | B1 for 1 correct Or answers figs 4, 36 and 38 | Accept $\frac{4}{10}$, $\frac{18}{50}$, $\frac{76}{200}$ etc |
| | (b) | 0.38, more trials [give a better estimate] | 1 | | see exemplars Accept any implication of 200 spins column for 0.38 Award 0 if any incorrect statement |
| | (c) | 180 to 200 | 1 | FT 500 × <i>their</i> relative frequency from (b) | allow ±10 from calculated value Accept a range if end values are within given range FT only if relative frequency < 1 Condone eg 190/500 as answer |
| | (d) | No, would expect probability of 0.2 if fair Or No, would expect 100 3s if fair | 1 | | see exemplars Should compare probabilities or expected outcomes If 'Yes' award 0 |
| 21 | (a) | 1.4 | 3 | M1 for $11 \times 0 + 8 \times 1 + 6 \times 2 + 0 \times 3 + 3 \times 4 + 2 \times 5$ M1 dep for <i>their</i> '42' ÷ 30 soi | Attempt to find sum of products, at least 4 correct products seen Implied by 42 seen Attempt to divide <i>their</i> sum by 30, implied by correct answer to division after total seen |

| Question | | Answer | Marks | Part Marks and Guidance | | |
|----------|-----|--|----------------------|---|--|---|
| | (b) | Autumn, Spring With 17[.1...] and 16[.3...] or 16.4 and 12 or 11[.7...] seen OR Autumn, Spring with 21 and 17[.4] and 19[.2] seen | 3 | M2 for at least two of 17, 16 and 12 (or 11) or better seen Or M1 for $24 \div 140$ or $19 \div 116$ or $15 \div 128$ soi Alternative method M2 for at least two of 21, 17[.4], and 19[.2] seen Or M1 for 0.15×140 or 0.15×116 or 0.15×128 soi | For 3 marks all 3 values must be rounded or truncated to at least 2 s.f. Allow decimal equivalents for percentages Exact percentages are: Autumn 17.14...% Spring 16.379...% Summer 11.718...% For non-calculator method, must see 10% correctly evaluated with attempt at 5% and attempt to add | |
| 22 | (a) | (i) | 3, 11, 19 | 2 | B1 for 2 correct in correct position Or SC1 for 5, 3, 11 | |
| | | (ii) | No with valid reason | 1 | Reasons to involve one of: A All numbers are odd numbers or 96 is even B Use of 91 and 99 C Use of 12.625 D Use of 91 and add 8 E Use of 101 and divide by 8 F 96 is a multiple of 8 | See exemplars |
| | (b) | | $23 - 7n$ oe | 2 | M1 for $7n$ seen | Condone $s = 23 - 7n$, $t_n = 23 - 7n$ for 2 marks But $n = 23 - 7n$ scores M1 only |

| Question | Answer | Marks | Part Marks and Guidance |
|----------|--|--|---|
| 23 | <p>$\angle BCD = 100^\circ$</p> <p>Correct relevant reason seen</p> <p>Two relevant reasons linked with correct angles and no reasons linked incorrectly with angles</p> | <p>B2</p> <p>M1</p> <p>A1</p> | <p>Or B1 for two correct angles found</p> <p>Relevant reasons are: alternate [angles] isosceles [triangle] Co-interior/allied [angles] ... 180 [angles in] triangle [is>equals/adds to] 180 [angles on a straight] line [is>equals/adds to] 180</p> <p>Any of the relevant angles must be correct if stated A0 if any reason used incorrectly or angles stated incorrectly</p> <div style="text-align: center;"> </div> <p>Diagram shows relevant angles</p> <p>Angles may be indicated on diagram 100 marked on diagram can be one angle for B1, but for B2 must be identified as angle BCD.</p> <p>Condone Z angle for alternate Condone C angle ... 180 for co-interior Condone isos for isosceles Where 180 is required in reason, this may be seen in the relevant calculation</p> |

APPENDIX 1

Exemplar responses for question 10(b)

| Response | Mark awarded |
|---|--------------|
| Half =£110 =£55. In dollars you can get \$87 for £55. Then double it, to get you \$174 for £110 | 2 |
| £50 = 78 100 = 156 10 = 16 156 + 16 = 172 \$172 | 2 |
| 160 +16 =\$176; 50=80 100=160 10=16 | 2 |
| 78×2=156. 156+16=\$172. Found £50, doubled it and found £10 worth and added it the doubled £50 answer | 2 |
| £55=\$88, £110=\$176. I worked out how much you would get if you was to have £55 then doubled the answer | 2 |
| £64=\$100 £60=£94 £50=\$78. She will have 172 Dollars. I found two numbers which added up to 110 pound the found what they were in Dollars then added them together | 2 |
| first I did 110-60=50, £60=\$94,£50=\$78, 94+78=172\$ | 2 |
| £10=\$16=£100=\$160; £100+£10=£110 \$160+\$16=\$176 | 2 |
| \$176; Every £10 is \$16, every £100 is \$160 (<i>Bare minimum</i>) | 2 |
| £10=\$16, 16×11=176 | 2 |
| | |
| £10=\$15, £50=\$75, 75+75+15=\$165 (<i>answer not in required range but values used are reasonable</i>) | 1 |
| \$171, I worked out my answer by extending the graph (<i>answer in range but explanation not acceptable</i>) | 1 |
| £50=\$79. £10=\$12=79+79+12=\$170. I worked out what £50 was in dollars then multiplied by 2 and added what £10 was worth in dollars (<i>answer not in range, but a good explanation with an inaccurate, but reasonable conversion for £10</i>) | 1 |
| \$178; I found £55 and doubled it (<i>answer not in range, but explanation just good enough</i>) | 1 |
| | |
| \$150, I have obtained it by drawing extra lines on my graph | 0 |
| On the graph I worked out what \$100 would be in pounds which equals £66. I then worked out what \$10 was which was £6 and added them together to make £72 | 0 |
| Ans \$66. I know that £10 is equal to \$6 so I found that amount and timesed it by 11 so it would be equal to £110 | 0 |
| | |
| | |
| | |
| | |

Exemplar responses for question 19(b)(i)

| Response | Mark |
|---|---|
| Quarter of an hour is 15 minutes not 25 minutes | 1 |
| There are 60 minutes in an hour not 100, so 0.25 of an hour can't be 25 minutes | 1 [first part alone is sufficient] |
| 2.25hours for 2h 25 m suggests 100 mins in an hour | 1 |
| There aren't 100 mins in an hour so 0.25 is not 25 minutes | 1 |
| Not 100 mins in an hour so 0.01 is not 1 minute. | 1 |
| 2 hours 25 mins is not 2.25 hours it is 2.416 hours. | 1 [shows correct conversion, acceptable to give 2.42] |
| 0.25 is a quarter of an hour not 25 minutes | 1 |
| It doesn't say in the question that the .25 is minutes so it is $\frac{1}{4}$ which would be 15 minutes | 1 |
| It's not 25 minutes it's 25% of an hour | 1 |
| She didn't times 60 by 2.25. Decimals go up to 100 not 60. | 1 [suggests how to get correct answer] |
| 2.25 gives 2 hours and a quarter so its 2.15 minutes | 1 [condone incorrect notation] |
| She thinks there are 100 minutes in an hour | 1 [bod just enough] |
| All she did was remove the decimal point, and she didn't convert it to minutes using 60 | 1 [just enough] |
| | |
| Time goes in 60 not 100. | 0 [not enough, needs some units] |
| A quarter of 60 is 20 | 0 [incorrect] |
| There are 60 minutes in an hour | 0 [not enough] |
| She hasn't fully changed the hours into minutes | 0 [not enough] |
| $60 + 60 + 25 = 145$ minutes | 0 [not enough] |
| The journey would be 145 minutes | 0 [not enough] |
| 2.25 hours in minutes is actually 135 minutes | 0 [not enough, needs to relate 135 to 2 h 25 min] |
| Because both times are different the first one is two and a quarter hours | 0 [needs to compare with 25 mins] |
| 0.25 is quarter of an hour | 0 [not compared] |
| 0.25 is not 25 minutes | 0 [just not enough, no explanation] |

Exemplar responses for question 19(b)(ii)

| Response | Mark |
|---|---|
| The answer should be larger than 3570 | 1 |
| The answer should be bigger than the original number | 1 [implies 3570] |
| The answer should be higher because she has divided by a number less than 1 (0.....) | 1 |
| The answer is lower than the original number | 1 [answers question] |
| $3600 \div 0.9 = 4000$ so too small | 1 [if estimation used both rounding and answer must be correct] |
| Because 0.93×3391.5 would not give a whole number because of the decimals so can't be 3570 | 1 [correctly identifies a different aspect of the error] |
| It's not going to have a first decimal number of 5 | 1 [only accept this type of explanation if .5 is specified] |
| Her answer is lower than her starting number | 1 [implies 3570] |
| The number when dividing below 1 would be larger than the answer she gave | 1 |
| She is dividing by a decimal which would make her number bigger | 1 [bod 'decimal' implies <1] |
| The answer is too small when dividing by a decimal the number increased | 1 [bod 'decimal' implies <1] |
| Because it's less than the number its being divided from. | 1 [very borderline] |
| Her answer should get larger as she is dividing by a decimal | 1 [bod 'decimal' implies <1 condone lack of what it is larger than] |
| | |
| It should get higher not smaller | 0 [not clear enough] |
| The answer is too small | 0 [not enough] |
| $3600 \div 1 = 3600$ so her answer should be roughly the same as the original number | 0 [not enough] |
| Estimate $3500 \div 1 = 3500$ the answer should be higher than 3500 | 0 [not clear] |
| $3570 \div 0.9 = 3966.7$ meaning her answer has to be greater | 0 [no credit for calculations using calculator] |
| Because the answer is higher than the question | 0 [not clear enough] |
| Because 0.93 is almost equal to 1 so it would be closer to 3570 | 0 [needs to imply larger than 3570] |
| Because it is close to 1 and $3570 \div 1$ is not close to 3391.5 | 0 |
| The answer should be higher. | 0 [not enough] |

Exemplar responses for question 20(b)

| Response | Mark |
|--|--|
| 0.38, used more spins | 1 [implies more trials] |
| 200, if you do more spins then you will get more accurate results | 1 |
| 0.38, he span it 200 times so more reliable | 1 |
| 124, it samples a larger number | 1 [bod, 124 identifies correct column] |
| 0.38 because it's the highest number | 0 [not clear that highest number of spins] |
| 98 out of 200, it shows that Jayden has also scored other numbers out of the 200 spins | 0 [irrelevant] |
| 0.38, it's between 0.4 and 0.36 so is more reliable | 0 [irrelevant] |

Exemplar responses for question 20(d)

| Response | Mark |
|--|--|
| No, for 10 it should be 2, for 50 it should be 10 and for 200 it should be 40 | 1 [compares expected outcomes] |
| No, you shouldn't expect 180, you should expect 100 if it was fair | 1 compares expected outcomes] |
| No, if it was fair he would score 3 every 5 times, but he scores it much more frequently than every 5 times | 1 [implies expected outcomes] |
| No, more 3s were scored than other numbers, it was not equal | 1 [borderline but implies unequal probabilities] |
| No the relative frequency of 3 is higher than it should be if it was fair | 1 [borderline as doesn't state 0.2] |
| No, out of the 5 sides 3 comes up nearly half the times | 1 [just acceptable, implies unequal] |
| | |
| No, he scores 3 roughly a quarter of the time and there are 5 numbers so it's likely the 3 section is bigger than the others | 0 [but if it said more than quarter we would accept] |
| No, it has a better chance of landing on 3 than on any other number | 0 [this may not be true, would be acceptable if also said not equal] |
| No, the numbers are not close together | 0 |

Exemplar responses for Q.22(a)(ii)

| Response | Mark |
|--|--------------------------------------|
| No, all numbers in sequence are odd and 96 is even | 1 A |
| No, the sequence is all odd numbers | 1 A |
| No, no even numbers in sequence | 1 A |
| No, 91 and 99 are in the sequence | 1 B |
| No, the sequence is + 8, when we come to 91 we have to plus it with 8, so then it becomes 99 | 1 B or D |
| No, because $8 \times 12 - 5 = 91$ / $8 \times 13 - 5 = 99$ | 1 B |
| No, $8n - 5 = 96$ gives 12.625 which is not an integer | 1 C |
| No, 12.625 is not an integer | 1 C |
| No, because $101 \div 8 = 12.625$ | 1 C |
| No, because 8 cannot be added to 91 to get 96 | 1 D |
| No, 91 is in the sequence and then we have to add 8 not 5 | 1 D |
| No, Add 8 to 91 and it gives 99 | 1 B or D |
| No, 8 does not go into 101 | 1 E |
| No, because $101 \div 8$ gives a decimal answer | 1 E |
| No, because 101 is not in the 8 times table | 1 E |
| No, because $8 \times 12 = 96$ | 1 F [implies multiple of 8] |
| No, because $96 \div 8 = 12$ | 1 F [implies multiple of 8] |
| No, because $96 \div 8 = 12 - 5 = 91$ | 1 F [implies multiple of 8] |
| No, because 96 is in the 8 times table so we don't need to subtract 5 | 1 F [implies multiple of 8] |
| | |
| No, the difference between the terms are adding 8 | 0 [no 91] |
| No, it is because the term closest to 96 is 91 which makes it impossible to be the next term | 0 [no 99 or add 8] |
| No, because in this sequence if you add 8 you will not get 96 | 0 [no 91] |
| No, never in the "+ 8" sequence | 0 [no 91] |
| No, n won't be a whole number | 0 [insufficient, need to see 12.625] |
| No, 96 is a factor of 8 | 0 [incorrect use of factor] |

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