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| --- | --- | --- | --- | --- |
|  | A (6 marks) | B (4 marks) | C (3 marks) | D (2 marks) |
| Identifies and organises relevant information | **Identifies the underlying assumptions related to the relevant mathematics of an investigation.**  Restates the problem in own words and includes reasonable assumptions made and explains why.  Lists the following and explains the context:   * Time and date relevant to school year * Budget allocated | **Identifies suitable variables and constant parameters related to various aspects of an investigation.**  Restates the problem in own words and includes assumptions made but does not explain reasoning.  Lists the following with some explanation of the context   * Time and date with no relevance to the school year * Budget | **Identifies some mathematical content related to various aspects of an investigation in a given context.**  Restates the problem that is being solved in own words. Lists the following with no explanation of the context   * Time and date with no relevance to the school year * Budget | **Identifies limited mathematical content of an investigation.**  Does not state the problem being solved in own words  States requirements as a list or in an unclear manner.  No assumptions made to allow for estimation or support the mathematical thinking process |
|  | A (12 marks) | B (8 marks) | C (6 marks) | D (4 marks) |
| Chooses effective models and methods | **Produces results, carries out analysis and generalises in situations requiring investigative techniques.**   * + 1. **Use leading digit approximation to obtain estimates of calculations -** Working out is presented clearly and is straightforward to follow and interpret - All estimates are correct     2. **Check results of calculations for accuracy** - Compares all estimated values and results of calculations for accuracy based on actual values obtained by research     3. **Ascertain the reasonableness of answers, in terms of context, to arithmetic calculations** - Amounts calculated for the cost of the event are based on researched values **-** Cost per head is a reasonable amount for a Year 11 student event and an explanation is provided     4. **Round up or round down answers to the accuracy required, including to the required number of decimal places -** Values involving money are correct to 2 decimal places | **Attempts to analyse and calculate specific cases of generalisation in situations requiring investigative techniques.**   * + 1. **Use leading digit approximation to obtain estimates of calculations** - Working out is presented neatly but is not easy to follow - Most estimates are correct     2. **Check results of calculations for accuracy** - Compares some estimated values and results of calculations for accuracy based on some values obtained by research     3. **Ascertain the reasonableness of answers, in terms of context, to arithmetic calculations** - Amounts calculated for the cost of the event are based on some researched values **-** Cost per head is determined to be a reasonable amount for a Year 11 student event with no explanation     4. **Round up or round down answers to the accuracy required, including to the required number of decimal places -** Values involving money are mostly correct to 2 decimal places | **Select appropriate methods to carry through a single thread of reasoning in situations requiring investigative techniques.**   * + 1. **Use leading digit approximation to obtain estimates of calculations -** Working out is present and is not easy to follow - Some estimates are correct     2. **Check results of calculations for accuracy** - Compares only calculated results for accuracy based on actual values obtained by research     3. **Ascertain the reasonableness of answers, in terms of context, to arithmetic calculations** - Amounts calculated for the cost of the event are based on one or two researched values **-** Cost per head is calculated with no explanation whether it is a reasonable expenditure     4. **Round up or round down answers to the accuracy required, including to the required number of decimal places -** Some values involving money are correct to 2 decimal places | **Makes some attempt to select appropriate methods in situations requiring investigative techniques.**   * + 1. **Use leading digit approximation to obtain estimates of calculations -** Working out is vague - No estimates are made or are missing     2. **Check results of calculations for accuracy -** Calculations are incorrect **-** No comparison made between calculated results with researched values     3. **Ascertain the reasonableness of answers, in terms of context, to arithmetic calculations** - Amounts calculated for the cost of the event are not based on researched values **-** Cost per head is not calculated     4. **Round up or round down answers to the accuracy required, including to the required number of decimal places -** There is no consistency in rounding money amounts. |
|  | A (10 marks) | B (7 marks) | C (5 marks) | D (3 marks) |
| Follows mathematical conventions and accuracy | **Selects, extends and applies mathematical and/or statistical procedures to investigate a problem.**   * + 1. **Choose and use addition, subtraction, multiplications and division, or combinations of these operations, to solve practical problems** - Applies correct formulas in MS Excel to perform the four operations in a logical manner     2. **Apply arithmetic operations according to their correct order -** Mathematical operations are performed in logical flowing progression and relate to the context     3. **Apply approximation for calculations if appropriate -** Estimates are used for reasonable assumptions for parameters that cannot be determined by research   **-** Detailed explanation of reasoning for estimates is provided   * + 1. **Use mental and/or flexible written strategies when appropriate** - Mathematical operations chosen are accompanied with an explanation of choice. | **Selects and applies mathematical and/or statistical procedures previously learnt to investigate a problem**.   * + 1. **Choose and use addition, subtraction, multiplications and division, or combinations of these operations, to solve practical problems** - Applies mostly formulas in MS Excel to perform the four operations in a logical manner     2. **Apply arithmetic operations according to their correct order -** Mathematical operations are performed in a logical flowing progression but are not consistently linked to the context.     3. **Apply approximation for calculations if appropriate -** Estimates are used for assumptions and some parameters that can be determined by research   - Brief explanation of reasoning for estimates is provided   * + 1. **Use mental and/or flexible written strategies when appropriate** - Mathematical operations are chosen with few explanations | **Selects and applies, with direction, mathematical and/or statistical procedures previously learnt to investigate a problem.**   * + 1. **Choose and use addition, subtraction, multiplications and division, or combinations of these operations, to solve practical problems** - Applies some formulas in MS Excel to perform the four operations in a logical manner     2. **Apply arithmetic operations according to their correct order -** Mathematical operations are performed logically but are not linked to the context     3. **Apply approximation for calculations if appropriate -** Estimates are used throughout the investigation - Some explanation of reasoning for estimates is provided     4. **Use mental and/or flexible written strategies when appropriate** - Mathematical operations are chosen with no explanation of choice. | **Attempts to apply mathematical and/or statistical procedures to a problem.**   * + 1. **Choose and use addition, subtraction, multiplications and division, or combinations of these operations, to solve practical problems** - Enters numerical values in MS Excel with no evidence of applying formulas     2. **Apply arithmetic operations according to their correct order -** Mathematical operations are not performed in a logical manner with vague mention of the context     3. **Apply approximation for calculations if appropriate -** Estimates are used throughout the investigation with no explanation of reasoning     4. **Use mental and/or flexible written strategies when appropriate** - Mathematical operations chosen are mostly applied incorrectly |
|  | A (6 marks) | B (4 marks) | C (3 marks) | D (2 marks) |
| Links mathematical results to data and contexts to reach reasonable conclusions | **Considers the strengths and limitations of an investigation and refines the results to make sensible conclusions.** | **Uses examples in mathematical analysis of an investigation and draws valid conclusions related to a given context.** | **Make inferences from analysis and uses these to draw conclusions related to an investigation.** | **Draws some conclusions from the results of an investigation.** |
|  | A (6 marks) | B (4 marks) | C (3 marks) | D (2 marks) |
| **Communicates mathematical reasoning, results and conclusions** | **Communicates investigation findings with a comprehensive interpretation of mathematical results in the context of the investigation.** | **Communicates investigation findings in a systematic and concise way using mathematical language and relating the solution to the original problem or statement.** | **Communicates investigation findings in a systematic way using some mathematical expression and everyday language.** | **Offers simple conclusions that are not supported by data or calculations** |

Overall Feedback: