

## **GENERAL EDUCATION AND TRAINING CERTIFICATE**

## **NQF LEVEL 1**

## **ABET LEVEL 4 SITE-BASED ASSESSMENT**

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| **LEARNING AREA** | **:** | **MATHEMATICS AND MATHEMATICAL SCIENCES** |
| **CODE** | **:** | **MMSC4** |
| **TASK** | **:** | **PROJECT** |
| **DURATION** | **:** | **3 WEEKS** |
| **MARKS** | **:** | **50** |

**This assessment task consists of 6 pages and 3 ANNEXURES.**

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| **INSTRUCTIONS AND INFORMATION** |  |  |

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| 1. | Answer ALL the questions in ANSWER BOOK. |  |  |

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| 2. | Read ALL the questions carefully. |  |  |

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| 3. | Calculators may be used. |  |  |

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| 4. | Clearly show calculations, diagrams, graphs, et cetera which you have used in determining the answers, |  |  |

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| 5. | Number the answers according to the numbering system used in this question paper. |  |  |

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| 6. | This project must be completed over a period of 3 weeks. |  |  |

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| 7. | The project can be done in groups of not more than 6 members. Each group member must submit their individual work even though they worked as a team. |  |  |

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| 8. | Read the instructions and questions carefully, and do thorough planning before you start with the project. |  |  |

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| 9. | You will need the following resources for this project   * Pencil * Ruler * A4 paper or cardboard * Calculator |  |  |

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| **ACTIVITY 1** |

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|  | In this activity, you will be using line graphs to construct a shape.  Complete the tables below using the given equations on Annexure A.  Use the completed tables in Annexure A to sketch the graphs on Annexure B.  Note:   * Do not go beyond the restrictions for each graph. * Label each graph according to the numbering of the equations. * Activity 1 will be marked using the rubric. |  |  |

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| A. | where |  |  |

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|  | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 |  |  |  |  |  | 1 | | *y* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |  |  |

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| B. | where |  |  |

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|  | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |  |  |

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| C. | where |  |  |

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|  | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | *y* | 0 |  |  |  |  |  |  |  |  | |  |  |

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| D. | where |  |  |

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|  | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | *y* |  |  |  |  |  |  |  |  |  |  | |  |  |

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| E. | where |  |  |

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|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 0 | 1 | 2 | 3 | 4 | 5 | | *y* |  |  |  |  |  |  | |  |  |

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| F. |  |  |  |

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|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 5 | 6 | 7 | 8 | 9 | 10 | | *y* |  |  |  |  |  |  | |  |  |

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| G. |  |  |  |

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|  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | |  |  |

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| H. |  |  |  |

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|  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | |  |  |

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| I. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* | 4 | 5 | 6 | | *y* |  |  |  | |  |  |

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| J. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* |  |  |  | | *y* | 3 | 4 | 5 | |  |  |

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| K. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* |  |  |  | | *y* | 3 | 4 | 5 | |

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| L. |  |  |  |

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|  | |  |  |  | | --- | --- | --- | | *x* | 2 | 3 | | *y* |  |  | |  |  |

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| M. |  |  |  |

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|  | |  |  |  | | --- | --- | --- | | *x* | 2 | 3 | | *y* |  |  | |  |  |

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| **RUBRIC** |  |  |

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| **Name and Surname:** |

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| **Centre Name:** |

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| **Criteria** | Level | | | | | Marks |
| 1 | 2 | 3 | 4 | 5 |
| **Coordinate tables** | At least one table completed correctly. | At least four tables completed correctly | At least eight tables completed correctly | At least 12 tables completed correctly | All tables completed correctly |  |
| **Plotting of graphs** | At least one graph plotted correctly | At least four graphs plotted correctly | At least eight graphs plotted correctly | At least 12 graphs plotted correctly | All graphs are plotted correctly |  |
| **Presentation and general impression** | Untidy work little effort taken with presentation. | Work in organised fashion, some effort taken | Partially presented | Work well presented, neat and complete | Excellent presentation |  |
| **Labelling of graphs** | At least one graph is labelled. | At least four graphs are labelled | At least 8 graphs are labelled | At least 12 graphs are labelled | All graphs are labelled |  |
|  |  |  |  | TOTAL | |  |

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| **ACTIVITY 2** |

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| Attached is an isometric dot paper (ANNEXURE C) in which you will draw patterns of triangles. The first and second patterns are already drawn. |  |  |

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| 2.1 | Draw the third and fourth patterns |  | (4) |

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| 2.2 | Given the following table representing pattern number () and number of small triangles (:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Pattern Number () | 1 | 2 | 3 | 4 | 5 | 6 | 25 | | Number of small triangles () | 1 | 4 | 9 |  |  |  |  | |  |

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|  | 2.2.1 | Copy and complete the table above. |  | (2) |

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|  | 2.2.2 | (Choose one answer from the possible answers given and write the letter next to the question number. e.g 2.4.6 D)  What type of a number system is formed by the number of small triangles (.   1. Prime numbers 2. Square numbers 3. Odd numbers 4. Even numbers |  | (1) |

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|  | 2.2.3 | Determine the general rule to work out how many small triangles are there in any pattern (). |  | (2) |

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|  | 2.2.4 | What is the pattern number if the triangle has 1296 triangles? |  | (2) |

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|  | 2.2.5 | Describe, in words, the relationship between the pattern number and the number of small triangles in the sequence. |  | (1) |

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| 2.3 | Given below is a representation of the relationship between the pattern number (*n*) and the number of dots used (*d*):   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Pattern Number () | 1 | 2 |  | 4 | 25 | | Number of dots () | 3 | 6 | 10 |  |  | | |  |  |
|  | 2.3.1 | If the general term for number of dots is , copy and complete the table. |  | (3) |

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|  | 2.3.2 | How many dots of the isometric dot paper will be needed for the 15th pattern? |  | (2) |

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|  | 2.3.3 | Is the number of dots a dependent or independent variable? |  | (1) |

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|  | 2.3.4 | Choose one answer from the possible answers given and write the letter next to the question number, e.g 2.4.6 D  What type of triangle are the drawn triangles?   1. Scalene 2. Right angled 3. Equilateral 4. Isosceles |  | (1) |

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|  | 2.3.5 | If you have 261 dots, will they create a complete triangle? Motivate your answer by showing calculations. |  | (3) |

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| 2.4 | Hexagon P is represented on ANNEXURE C. Use the centre dot as a reference point and answer the following questions: |  |  |

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|  | 2.4.1 | Give the name of the transformation that transformed P to Q. |  | (1) |

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|  | 2.4.2 | Hence, describe how P is translated to create Q. |  | (1) |

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|  | 2.4.3 | By what factor was hexagon Q enlarged to form hexagon R? |  | (1)  **[25]** |

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| **ANNEXURE A** |  |  |

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| A. | where |  |  |

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|  | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 |  |  |  |  |  | 1 | | *y* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |  |  |

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| B. | where |  |  |

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|  | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |  |  |

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| C. | where |  |  |

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|  | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | *y* | 0 |  |  |  |  |  |  |  |  | |  |  |

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| D. | where |  |  |

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|  | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | *y* |  |  |  |  |  |  |  |  |  | |  |  |

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| E. | where |  |  |

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|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 0 | 1 | 2 | 3 | 4 | 5 | | *y* |  |  |  |  |  |  | |  |  |

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| F. |  |  |  |

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|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 5 | 6 | 7 | 8 | 9 | 10 | | *y* |  |  |  |  |  |  | |  |  |

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| G. |  |  |  |

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|  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | |  |  |

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|  | **ANNEXURE A (Continued)** |  |  |

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| Name and Surname:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |

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| H. |  |  |  |

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|  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *x* |  |  |  |  |  | | *y* | 0 | 1 | 2 | 3 | 4 | |  |  |

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| --- | --- | --- | --- |
| I. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* | 4 | 5 | 6 | | *y* |  |  |  | |  |  |

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| J. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* |  |  |  | | *y* | 3 | 4 | 5 | |  |  |

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| K. |  |  |  |

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|  | |  |  |  |  | | --- | --- | --- | --- | | *x* |  |  |  | | *y* | 3 | 4 | 5 | |

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| L. |  |  |  |

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|  | |  |  |  | | --- | --- | --- | | *x* | 2 | 3 | | *y* |  |  | |  |  |

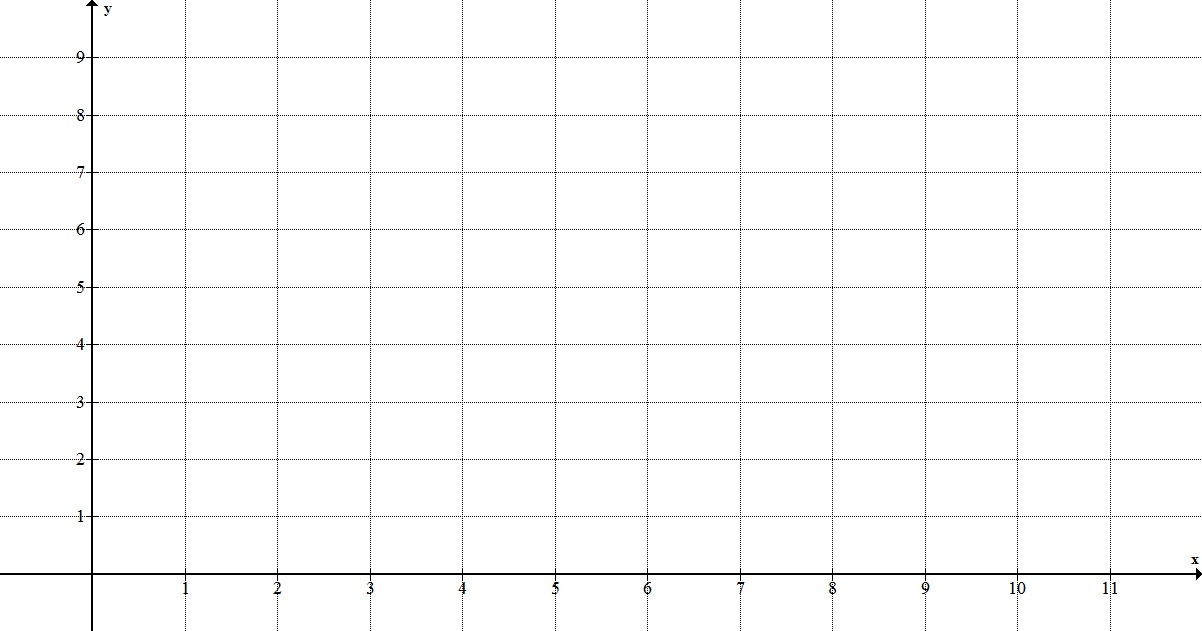
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| --- | --- | --- | --- |
| M. |  |  |  |

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|  | |  |  |  | | --- | --- | --- | | *x* | 2 | 3 | | *y* |  |  | |  |  |

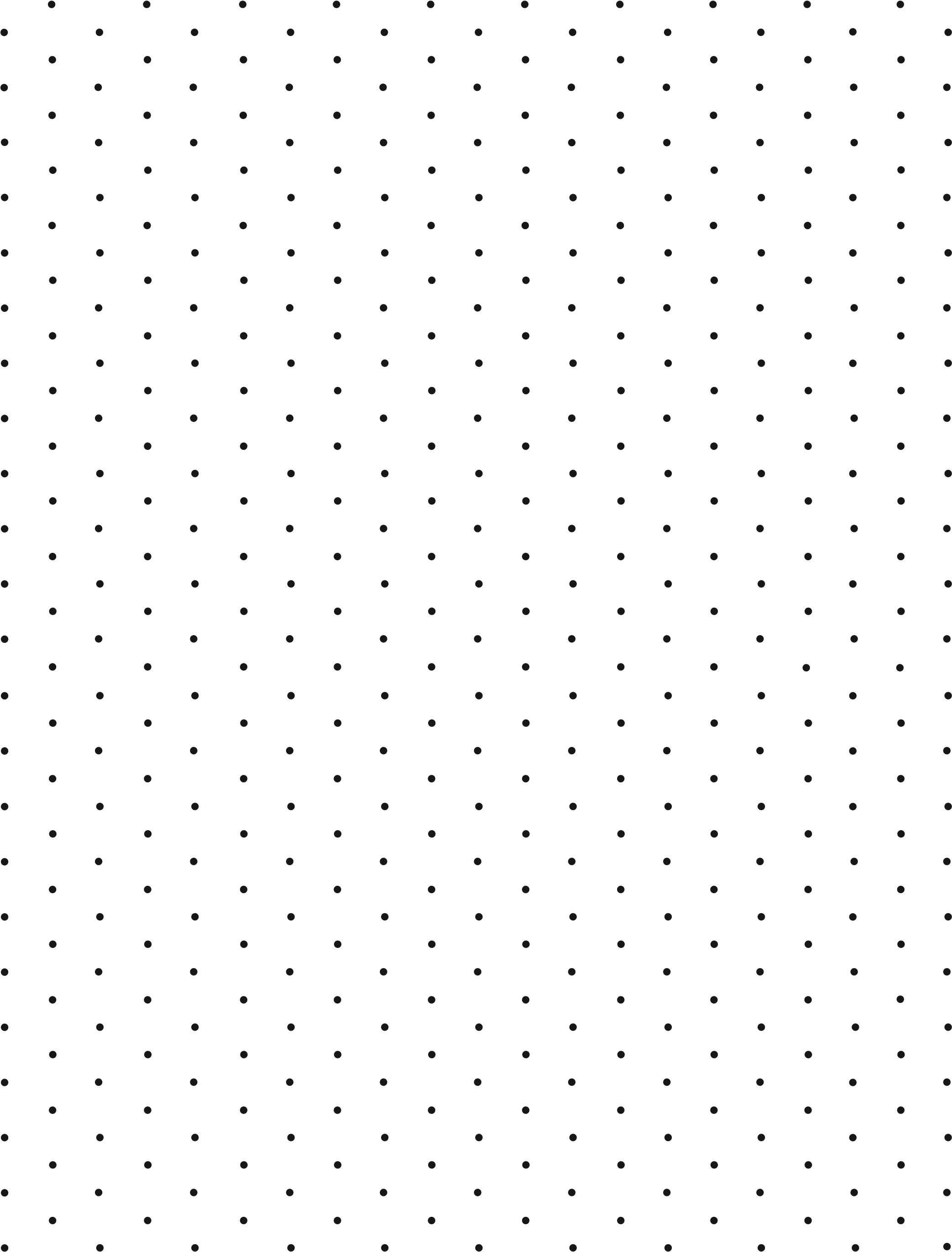
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|  | **ANNEXURE B** |  |  |

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| **Name and Surname:** |

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| **Centre Name:** |



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|  | **ANNEXURE C : Isometric Dot Paper** |  |  |
| **Name and Surname:** | | | |
| **Centre Name:** | | | |



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