

## **GENERAL EDUCATION AND TRAINING CERTIFICATE**

## **NQF LEVEL 1**

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

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

**This assessment task consists of 5 pages and 1 addendum.**

**INSTRUCTIONS AND INFORMATION**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | This project should be done in pairs. Each member should however write his/her own work to submit. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 2. | Read questions carefully, and do thorough planning before you start with the project. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 3. | QUESTION 1 will be marked using a RUBRIC and QUESTION 2 will be marked using a MEMORANDUM. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 4. | Follow the additional INSTRUCTIONS given for each activity. |  |  |

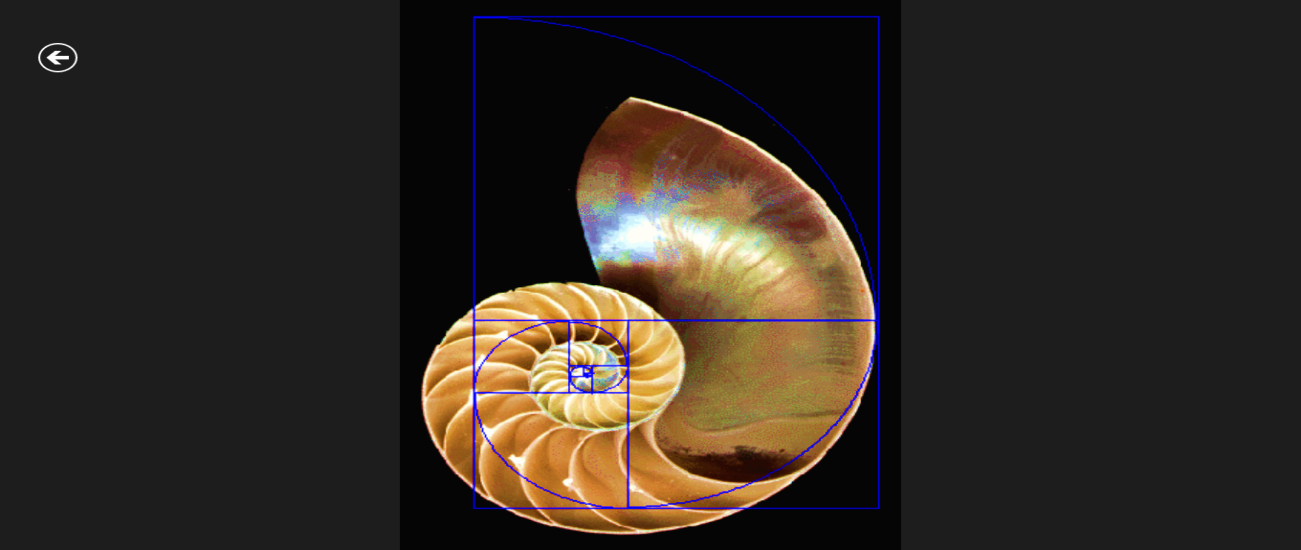
|  |  |  |  |
| --- | --- | --- | --- |
| 5. | You may use an approved calculator. Round ALL the final answers off to TWO decimal places unless stated otherwise. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 6. | You will need the following resources for this project:   * A4 White paper OR Thin cardboard * A Pair of scissors * A Tracing paper and a pin * Pencil * Crayons * Ruler * Felt pen * Glue * Magazines, newspaper or Google in an internet |  |  |

**QUESTION 1**

|  |  |  |
| --- | --- | --- |
| The golden ratio:  There is a connection between the golden ratio and number sequence developed by medieval Italian mathematician Leonardo da Pisa who is better known as Fibonacci sequence. He introduced the number sequence In 1202.*www.livescience.com*. The sequence is compiled as follows: Start with 1and 1, add them to get 2, add 1and 2 to get 3, add 2 and 3 to get 5 and so on. This pattern occurs in art, architecture, nature and mathematics: An example of this pattern in nature is a shell: The spiral in the shell curves from inside out to form a successive Fibonacci numbers. This forms an equiangular spiral in the Nautilus shell. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Shell  C:\Users\NGOBENI TA\Desktop\baba\images-8.jpeg | C:\Users\NGOBENI TA\Desktop\images-6.jpeg |  |  |



|  |  |  |
| --- | --- | --- |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.1 | Use books, magazines, newspapers or Google in an internet. Collect any 5 pictures that have a Fibonacci sequences. Examples of these pictures are: Sunflower; Pineapple; Pinecones; Flower petals; Seed head; Cauliflower; Dolphins; Honey bees; Ants; trunk of an Elephant; horns of Ram; Penguins; Giraffe; Zebra; Tortoise; Hurricanes or any other pattern that has artist or nature that has golden ratio or Fibonacci sequence. Trace or cut pictures and then paste on a A4 paper or cardboard. Colour your pictures that are traced. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.2 | Explain TWO different features that you have observed based on Fibonacci in each picture that you have collected. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.3 | Explain using your own words how to create Fibonacci sequence. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.4 | Write at least the first fifteen terms of Fibonacci sequence. Divide each number in the Fibonacci sequence by the number before it. For example ;;… Explain what you notice about your results as you move further down the sequence. |  |  |

**NAME OF LEARNER**

**NAME OF CLC**

|  |  |  |
| --- | --- | --- |
| **MARKING RUBRIC FOR** **QUESTION 1.1–1.4** |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Act** | **CRITERIA** | **LEVEL** | | | | **MARK** |
|  | | **MARKS**  **0** | **MARKS**  **1–2** | **MARKS**  **3–4** | **MARKS**  **5** |  |
| 1.1 | Relevant pictures with designs of Fibonacci sequence pasted or coloured | No picture, pasted on the cardb-oard | Pictures not relevant to Fibonacci sequence | More than two relevant pictures pasted with design shows the design of Fibonacci sequence | Four relevant pictures and clear pictures showing the designs of Fibonacci sequences pasted or coloured. |  |
|  | | **MARK**  **0–1** | **MARKS**  **2** | **MARK**  **3** | **MARKS**  **4** |  |
| 1.2 | Explanation relevant to the pictures pasted or traced pictures of Fibonacci sequence | No explanation made based on Fibonacci sequence. | Less explanation about the pictures with relevance to Fibonacci sequence | Explaining more about the pictures relevant to Fibonacci sequence | Clear understanding of picture and Fibonacci sequence |  |
| 1.3 | Definition of the Fibonacci sequence | | **MARK**  **0–1** | **MARK**  **2–3** | **MARKS**  **4** |  |
|  | | | No definition/no example | Definition with 1example | Definition with 3 examples |  |
| 1.4 | Extending the first 15 terms of Fibonacci sequence, using the correct ratio. | **MARKS**  **0** | **MARKS**  **1–2** | **MARKS**  **3–5** | **MARKS**  **6** |  |
| No terms, or using the correct ratio. | Less than 6 terms or using the correct ratio. | More than 6 term and dividing by previous term and to get the correct term | Extending of all 15 Fibonacci sequence terms and dividing by previous term and to get the correct term. |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| **QUESTION 2** |

|  |  |  |  |
| --- | --- | --- | --- |
| 2.1 | The pattern below is called Pascal triangle, it was named after Blaise Pascal (*www math’s is fun.com*). The first six rows of Pascal‘s triangle have been filled. |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | C:\Users\NGOBENI TA\Desktop\MMSC4.jpg |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.1 | Use ADDENDUM (attached) and complete the next ROWS in the Pascal triangle. |  | (5) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.2 | Explain the sum of the numbers in each row. |  | (2) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.3 | Describe the pattern to the number of times a number is used in each row in the Pascal triangle. |  | (2) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.4 | Explain in your own words what *triangular numbers* are. |  | (2) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.5 | Show the following sequence using a diagonal line in the Pascal triangle that you completed in ADDENDUM (attached).   1. Natural numbers 2. Triangular numbers 3. Fibonacci numbers |  | (3) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.6 | The general rule for triangular numbers is. Calculate the term. |  | (2) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.1.7 | Colour in ADDENDUM (attached) using two colours, one for odd numbers and the other for even numbers. Explain your findings after colouring. |  | (4)  **[20**] |

|  |  |  |
| --- | --- | --- |
| **TOTAL:** |  | **50** |

**ADDENDUM**

**NAME OF LEARNER:**

**NAME OF CLC:**

