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**Mathematics 5N1833 – Trial Paper Solutions**



**2024**

**Course(s):**

**AA [Applied Science: Laboratory Techniques]**

**AB [Applied Biology: Food Health & Nutrition]**

**Extra Maths**

**Total Marks: 800marks**

**Weighting: 40%**

**Time Allowed: 2 Hours**

**Section A** (400 Marks)
10 short questions.

Answer **ALL** 10

**40 marks each**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.**  |   | Determine the equation of a line in the form  if the points (1,2) and (3,4) are on the line Slope m = = = Equation =  | **40 marks**  |
|   |   |   |   |
| **2.**  |   | The age distribution of a group of people who wear glasses is shown on this histogram.  |   |
|  |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **200** |   |  |  |  |  |  |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
| **150** |   |  |  |  |   |   |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
|  |   |  |  |  |   |   |  |  |  |  |
| **100** |   |  |  |  |   |   |  |  |  |  |
|  |   |   |  |  |   |   |  |  |  |  |
|  |   |   |  |  |   |   |  |  |  |  |
|  |   |   |  |  |   |   |   |   |   |   |
| **50** |   |   |  |  |   |   |   |   |   |   |
|  |   |   |  |  |   |   |   |   |   |   |
|  |   |   |   |   |   |   |   |   |   |   |
|  |   |   |   |   |   |   |   |   |   |   |
|  |   |   |   |   |   |   |   |   |   |   |
| **0** |  | **10** |  | **20** |  | **30** |  |  |  | **50** |
|  |  |  |  |  |  |  |  |  | **Age-group** |
|  |  |  |  |  |  |  |  |  |  |  |

 |  |
|  |  | If there are 200 people in the 20 – 30 age-group, find |  |
|   | (i)  | The number of people in the 30 – 50 age group 150 | **20 marks**  |
|   | (ii)  | The total number of people wearing glasses = 75+50+50+200+150 = 525 | **20 marks**  |
|   |   |   |   |
| **3.**  |  | How many different 3-digit numbers can be formed from the digits 1, 2, 3, 4  |   |
|   | (i)  | If no digit is repeated in the number?  | **20 marks**  |
|   | (ii)  | How many of these begin with 3? =  | **20 marks**  |
|   |   |   |   |
| **4.**  |   | a4cmad55o40ocb |  |
|   |   | In the given triangle abc, ad ⊥ bc. If ǀadǀ = 4cm, ǀabdǀ = 55o and ǀacdǀ = 40o,  |  |
|  | (i) | Find ǀbcǀ to 1 decimal place 2.8cm | **20 marks**  |
|  | (ii) | Find ǀacǀ to 1 decimal place= + | **20 marks**  |
|  |  |  |  |
| **5.**  |   | Using differentiation, calculate the slope of the tangent to the curve Slope = 6( | **40 marks**   |
|   |   |   |   |
| **6.**  |   |  |   |
|   | (i)  | Find  | **20 marks** |
|   | (ii)  | Find  | **20 marks**  |
|   |   |   |   |
| **7.**  |   |  | **40 marks**  |
|   |   |   |   |
| **8.**  |   | Evaluate  = - | **40 marks**  |
|   |   |   |   |
| **9.**  |   | If and evaluate the following:  |   |
|   | (i)  |   | **20 marks**  |
|   | (ii)  |  | **20 marks**  |
|  |  |  |  |
| **10.**  |   | Calculate the size of the angle at vertex A (angle CAB) in the triangle below. Give your answer correct to one decimal place, if necessary.  | **40 marks**  |
|   |   |   |   |

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| **Section B (200 Marks)** **2 Structured Questions.** **Answer ALL questions** **100 marks each**  |
|   |   |  |   |
| **1.**  | **(a)**  | The equation of the line is   |  |
|   | (i)  | Find the slope of a line perpendicular to line   | **10 marks**  |
|   | (ii)  | Find the equation of the line perpendicular to line and which passes through the point (-2, 1)  | **10 marks**  |
|   |   |   |   |
|   | **(b)**  | Draw a graph of `in the domain

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | **x3** | **3x2** | **-4x** | **-12** | **f(x)** |
| -3 | -27 | 27 | 12 | -12 | 0 |
| -2 | -8 | 12 | 8 | -12 | 0 |
| -1 | -1 | 3 | 4 | -12 | -6 |
| 0 | 0 | 0 | 0 | -12 | -12 |
| 1 | 1 | 3 | -4 | -12 | -12 |
| 2 | 8 | 12 | -8 | -12 | 0 |

|  |  |
| --- | --- |
| **x** | **f(x)** |
| -3 | 0 |
| -2 | 0 |
| -1 | -6 |
| 0 | -12 |
| 1 | -12 |
| 2 | 0 |

  | **30 marks**  |
|   |   | Use the graph to write down the following  |   |
|   |   |   |   |
|   | (i)  | Roots of the equation  | **10 marks**  |
|   | (ii)  | Find the coordinates of the local minimum point.  (0.53,-13.1) | **10 marks**  |
|   | (iii  | Find the coordinates of the local maximum point.  (-2.53, 1.13) | **10 marks**  |
|   | (iv  | The domain of values of x for which is negative -2 2 | **10 marks**  |
|   | (v)  | The domain of values of x for which is negative and increasing.  | **10 marks**  |
|   |   | 0.53 2 |  |
| **2.**  | **(a)**  |  |   |
|   | (i)  | Explain in your own words what is meant by the term ‘mode’ in relation to statistics? Mode is the **value that appears most often** in a set of data values | **10 marks**  |
|   |   |   |   |
|   | (ii)  | Complete the cumulative frequency table below from the given grouped frequency distribution table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Length in mm (x)  | 1-5  | 6-10  | 11-15  | 16-20  | 21-25  | 26-30  | 31-35  |
| Frequency (f)  | 4  | 8 | 10 | 12  | 11 | 6 | 4  |

  |    |
|   |   |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Length in mm (x)  | ≤5  | ≤10  | ≤15  | ≤20  | ≤25  | ≤30  | ≤35  |
| Frequency (f)  | 4 |  12 | 22 | 34  | 45  | 51  | 55  |

  |  **10 marks** |
|   |     | Using the cumulative frequency table above, draw the cumulative frequency curve(ogive) on graph paper and use your graph to provide answers for the following:  | **10 marks**  |
|   | (iii)  | Interquartile rangeUpper quartile value at frequency of 41.25 (75% of 55) = approx. 23mmLower quartile value at frequency of 13.75 (25% of 55 = approx. 10mmInterquartile range = 23-10 = 13mm | **10 marks**  |
|   | (iv)  | Median Median – Value at middle frequency of 27.5 (50% of 55) – approx. 17.5mm | **10 marks** |
|  |  |  |  |
| **2.**  | **(b)**  |  A card is selected at random from a pack of 52 and then replaced. A second card is then selected. What is the probability that  |  |
|   | (i) | The first card is a heart =  | **10 marks** |
|   | (ii) | Both cards are hearts = =  | **10 marks** |
|   | (iii) | The first card is red and the second card is black =  | **10 marks** |
|   | (iv) | The first card is a queen and the second card is black =  | **10 marks** |
|   | (v) | Neither card is a heart =  | **10 marks** |
|   |  |  |  |

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| **Section C (200 Marks)** **2 structured questions.  Answer ALL 2.** **100 marks each**  |
|   |
| **3.**  | **(a)**  | Differentiate with respect to x  |   |
|   |  |   | **30 marks**  |
|   |   |   |   |
|   | **(b)**  | Using integration, find the area bound by the curve  the and the lines and –== = 37 | **30 marks**  |
|   |   |   |   |
|   | **(c)**  | Find the turning points of the curve and determine if they are minimum or maximum turning points | **20 marks****20 marks**   |
|  |  |  |  |
| **4.**  | **(a)**  | Solve for and in the following equation  |   |
|   |  |   | **30 marks** |
|  |  |  |  |
|   | **(b)**  | Evaluate == (-1)(-1)(-1))(-1) = 1 | **20 marks** |
|   |   |   |   |
|   | **(c)**  | Solve the complex equation  Write your answers in the form a+bi= | **50 marks**  |
|   |   |   |   |