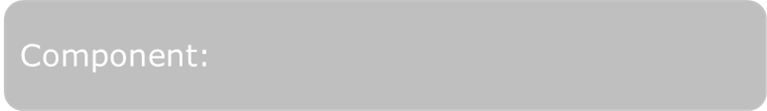
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**Mathematics 5N1833 – Trial Paper Solutions**

Shape, rectangle

Description automatically generated

**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.** |  | a  4cm  a  d  55o  40o  c  b |  |
|  |  | In the given triangle abc, ad ⊥ bc.  If ǀadǀ = 4cm, ǀabdǀ = 55o and ǀacdǀ = 40o, |  |
|  | (i) | Find ǀbcǀ to 1 decimal place    2.8  cm | **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** |
|  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **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 range  Upper quartile value at frequency of 41.25 (75% of 55) = approx. 23mm  Lower quartile value at frequency of 13.75 (25% of 55 = approx. 10mm  Interquartile 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** |
|  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |
|  |  |  |  |