ST. GODFREY (P.V.T.) SECONDARY SCHOOL

2021 MSCE MOCK EXAMINATION

MATHEMATICS

Subject Number: M131/I

Time Allowed: 2 hours8:00 – 10:00 am

PAPER II (100 marks)

Instructions

1. **This paper contains 15pages. Please check**

2. Before beginning, fill in your **Name** at the top of each page of the question paper

3. Answer all the **20** questions in the spaces provided.

4. Use of electronic calculators is allowed.

5. The maximum number of marks for have answered.

each question is indicated against each question

6. In the table provided on this page, **tick** against the question number you

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
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15			

1   **a.** Given that $\dfrac{9\sqrt{10} - 12\sqrt{3}}{\sqrt{6}} = m\sqrt{15} - n\sqrt{2}$, find the values of m and n.   (4 **marks)**
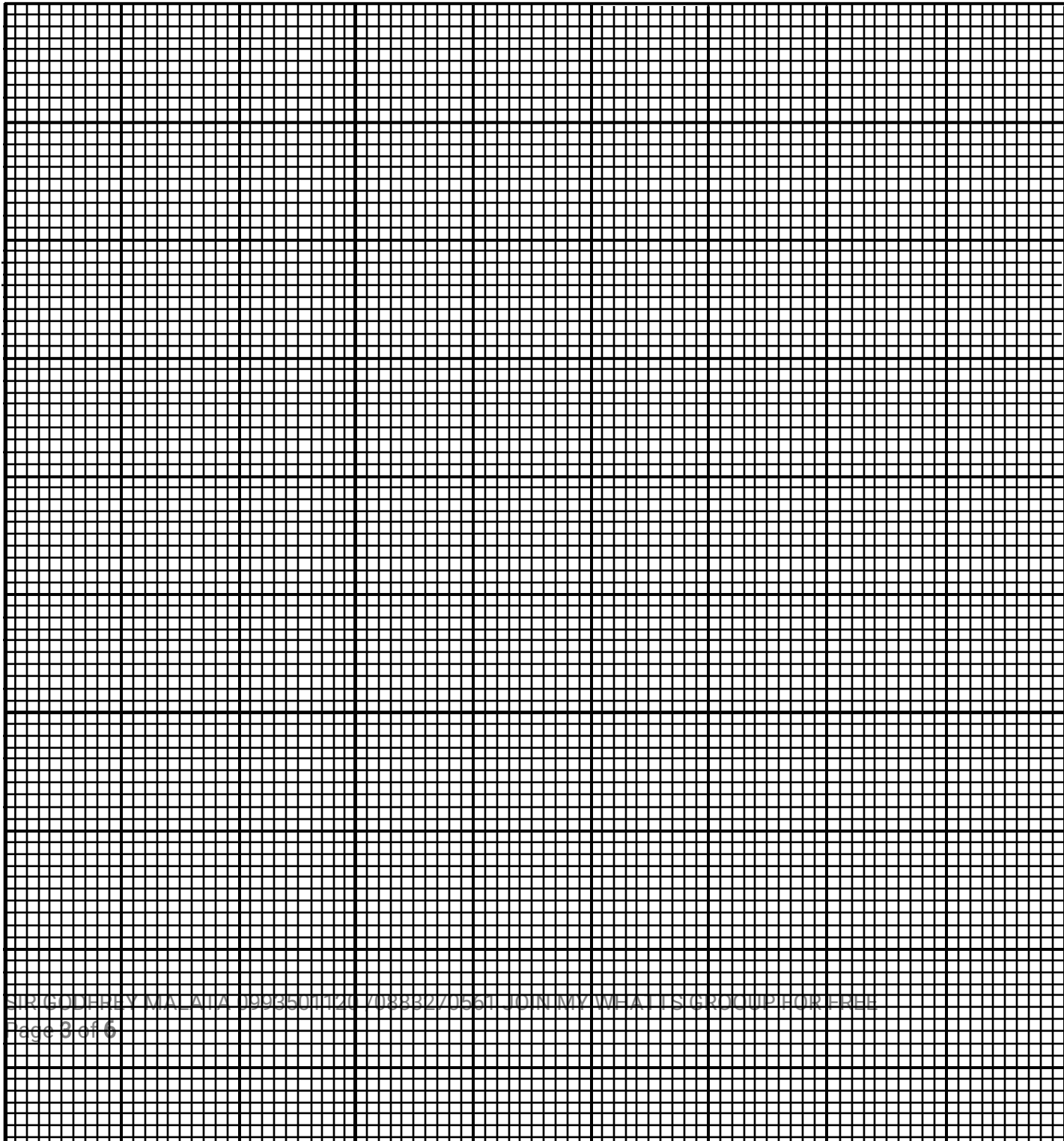
b. Make **n** the subject of the formula: $y = \sqrt[m]{\dfrac{k \div h^n}{c}}$ (5 **marks)**

2. **a. OABC** is a trapezium such that **O** is the origin, $\overrightarrow{OA} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, $\overrightarrow{OC} = 2\overrightarrow{AB} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$. On the graph

paper, mark and label the points **O, A, B** and **C.** **(4 marks)**

b. Given that f(2) =x² +2 -g(x) and f(x) =log$_x$ √2 +3, find g(x).   **(5 marks)**

3. a. In **Figure 1, ABCD** is a cyclic quadrilateral. The line **SBT** is the tangent at **B** to the circle. The lines **BA** and **CD** produced meet at **E** and **EA** =**AC**.Angle **CBT** =42⁰ and angle **EDA** =53⁰. Calculate angle **EAD.**
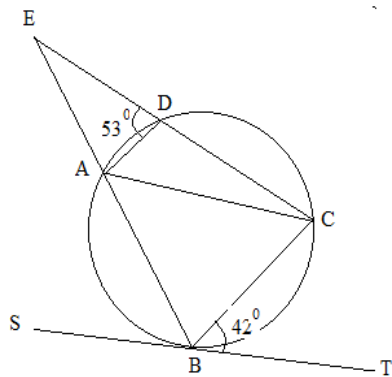
(5 marks)

b. The probability of a day being hot is $\frac{2}{5}$. The probability of a person wearing a jersey when the day is hot is $\frac{1}{7}$ and the probability of a person wearing a jersey when the day is cold is $\frac{5}{7}$. Calculate the probability of a person wearing a jersey.
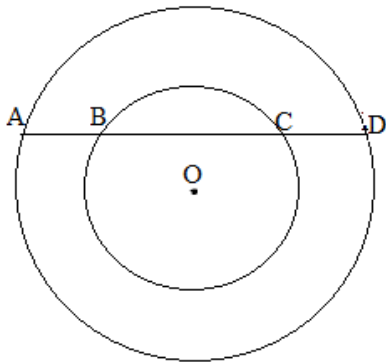
4. a Mean of data is 20 and its sum is 100. If the sum of the squares of deviations of the data is

   500, calculate standard deviation of the data.   (4 marks)

b. Figure 2 shows two circles with the same centre O.Show that **AB** =CD.   (4 marks)

5. a. Find the possible values of x can take, given that $A = \begin{pmatrix} x^2 & 3 \\ 1 & 3x \end{pmatrix}$, $B = \begin{pmatrix} 3 & 6 \\ 2 & x \end{pmatrix}$ and
AB =BA.

(7 marks)

b. Using a ruler and a pair of compasses only, construct in the same diagram:
  (i) a circle centre **O** with radius 3cm
  (ii) another circle radius 4cm passing through point **O**, label its centre **C** and label one of the intersection   point of the two circles **A.**
  (iii) construct a tangent to the circle centre **O** at point **A**
  (iv) measure angle **AOC.**
(5 marks)

6. a. A pine tree growing on a hill side makes a 75^0 angle with the hill. From a point 24m up the hill, the angle of elevation to the top of the tree is 62^0 and the angle of depression to the bottom is 23^0. Find to 1 decimal place, the height of the tree.

(5 marks)

    b. Find the equation of the line passing through the point (-5,2) and with x - intercept as 3.

(3

marks)

7 **a.** When the expression $x^3 + ax^2 + bx + c$ is divided by $x^2 - 4$ the remainder is $18 - x$ and when it is divided by $x + 3$ the remainder is 21. Find the values of a, b and c.

(9 marks)

SECTION B (40 MARKS)
Answer any four questions from this section

8. The expenses (E) of a farewell ceremony are partly constant and partly proportional to the number of students (n). For 80 students, the cost is K64, 000 and for 120 students, the cost is K88, 000. If school has K168,000 to spend, how many students should be participated (10 marks)

10. Table below shows some values of x and y for the equation $y = x^3 - 3x$

x	-3	-2	-1	0	1	2	3
y	-18	-2	2	0		2	

i.   Complete   the table of values

ii.   Using a scale of 2cm to represent 1 unit on x-axis and 2cm to represent 5 units on y-axis, draw the graph of $y = x^3 - 3x$

iii.   Use your graph to solve the equation $y = x^3 - 4x - 2$ (10 marks)

11. A farmer gets a loan if K60, 000 to buy chickens and ducks. Chickens cost K3, 000 each while ducks cost K6000 each. He would like to

spend atleast K12, 000 more on ducks than on chickens. She would like to buy atleast 2 chickens and atleast 3 ducks.

i. If x represents the number of ducks and y represent the number of chickens, write down four inequalities in x and y that satisfy the above information

ii. Using a scale of 2cm to represent 2 units on both axes, draw the graphs to show the region represented by the inequalities, by shading the unwanted region.

iii. How many chickens and ducks can the farmer buy to have maximum number of poultry with the loan
(10 marks)

12. Figure below shows a wedge such that ABCD, DCFE and ABFE are rectangles.
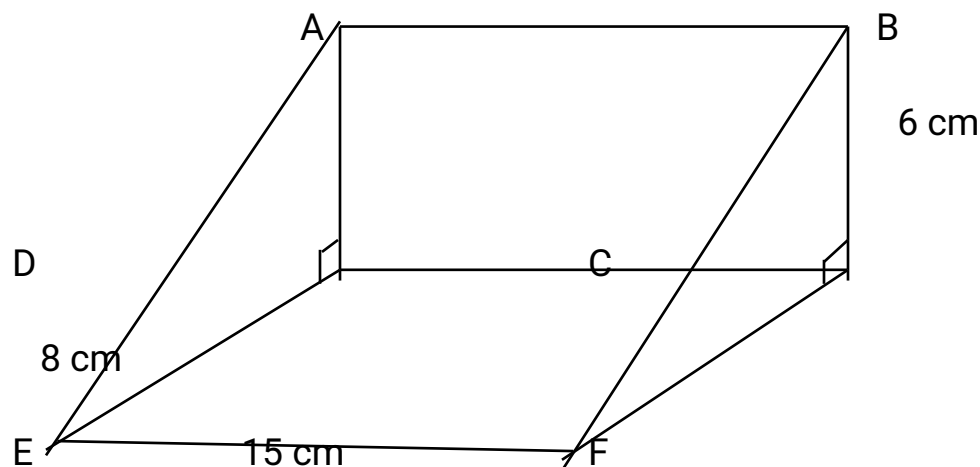
If EF = 15cm, CF = 8cm, BC = 6cm calculate
   a. Volume of the wedge
   b. The angle between plane CDEF and the line BE   (10 marks)

13. Two ships leave the port at the same time. One ships sails on the bearing of 155^0 and reached a distance of 40kn. Another ship sails on bearing of 245^0 and reached a distance of 60 km. With a well sketched diagram. Calculate angles between them

(10 marks)

14. By using a ruler and a pair of compasses only, construct in the same diagram:

a. Triangle ABC such that AC = 10cm, BC = 5cm and <ACB = 60^0,

b. Circum circle the triangle ABC

c. A tangent to the circle at A

d. Measure and state the acute angle the tangent makes with BA   (10 marks)

END OF QUESTION PAPER BUT TAKE IT SERIOUSLY