MARANATHA ACADEMY

2023 MALAWI SCHOOL CERTIFICATE PRE-MOCK TEST

MATHEMATICS

16th April 2023 **Subject Number: M131**

Time allowed: 1 hour 20 min

TEST I

(50 Marks)

Instructions

1. **This paper has 8 printed pages. Please check.**
2. Fill in your **Candidate ID** at the top of each page.
3. Answer **all** the **5** questions in this paper.
4. The **maximum number of marks** for each correct answer is indicated against the question
5. **All work must be clearly shown in the space provided for each answer.**
6. In the space provided, on this page, **tick** against the question number you have answered.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
5			
6			

1. a) Solve the following quadratic equation. Leave the answer correct to 3 significant figure.

$$t - 3t^2 + 5 = 0$$

(6 marks)

b) Formulate a quadratic equation of the form $ax^2 + bx + c = 0$ whose roots are 3 and $-{}^{2}/_{3}$

(4 marks)

Continued/…

2. Without using a calculator or four figure tables, simplify

a) $2\sqrt{96} - 3\sqrt{12} - \sqrt{24} - \sqrt{27}$

(4 marks)

b) $\frac{3+2\sqrt{6}}{\sqrt{3}-3}$ (leaving the answer with a rational denominator)

(6 marks)

3. a) Figure 1 shows circle ABDF centre O which FE is a tangent. $< BFD = 42° < DEF = 30°$

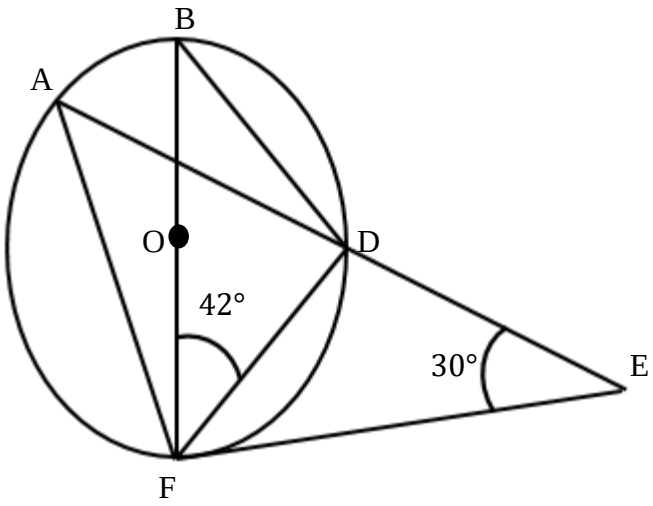

Figure 1

Find the value of <BFA

(5 marks)

b) A 24m long chord is 5m away from the centre of a circle. How long is another chord that is 8m away from the centre in the same circle?

(5 marks)

Continued/…

4. Given the matrices

$P = \begin{pmatrix} -2 & 1 \\ x & 2 \end{pmatrix}$, $Q = \begin{pmatrix} 1 & -1 \\ 3 & 2 \end{pmatrix}$ and $R = \begin{pmatrix} 2 & 8 \\ 6 & 14 \end{pmatrix}$

Find:

a) $Q^2 - 3Q$

(4 marks)

b) the values of x and y if $PQ - \frac{R}{2}$ is a zero matrix.

(6 marks)

5. A housemaid would like to clean plates and cups in a maximum of 12 minutes. She has 160g of soap that she must use. To clean each plate, it takes 2 minutes and uses 40g of soap while cleaning a cup takes 3 minutes and uses 20g of soap. She is allowed to spend at least 6 more minutes on washing plates than washing cups.

   a) Write down three inequalities in addition to $x \geq 0$ and $y \geq 0$ to represent this information.

(3 marks)

   b) Taking the scale of 2cm to represent 1 unit on both axes, illustrate the inequalities in the graph provided. Shade the unwanted region.

(5 marks)

   c) From the graphs drawn, find the maximum number of plates and cups that the maid can clean with the available resources.

(2 marks)

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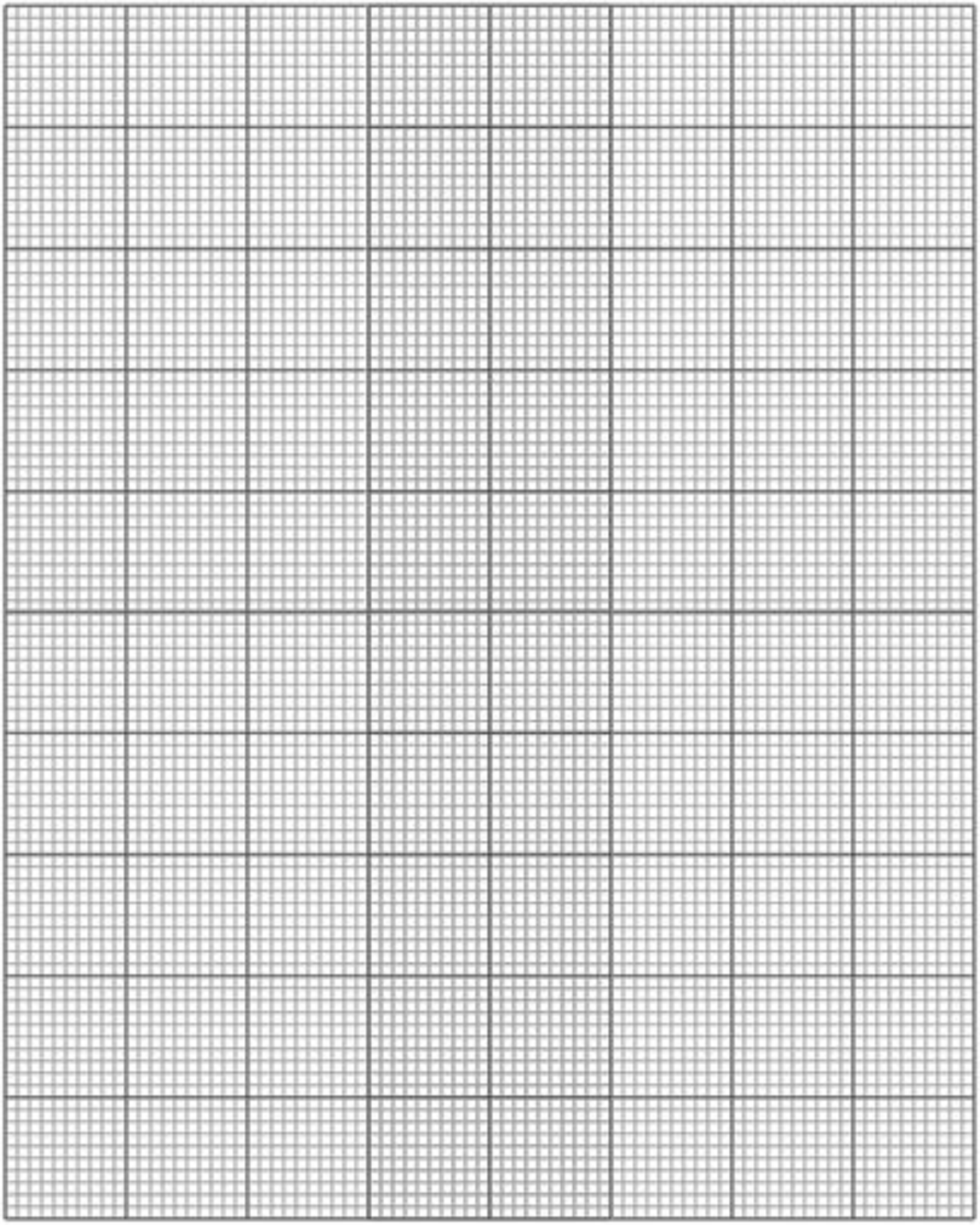

END OF QUESTION PAPER

NB: This paper contains 13 printed pages.