THE MALAWI NATIONAL EXAMINATIONS BOARD

2000 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

MATHEMATICS

Subject Number: M131/1

Monday, 18 December

Time Allowed: 2 hours
9 - 11:00 am

PAPER I
(100 marks)

Instructions:

1. This paper contains 6 pages. Please check.
2. Answer all the 24 questions in this paper.
3. The maximum number of marks for each answer is indicated against each question.
4. Mathematical tables and answer books are provided.
5. Used supplementary sheets must be tied together inside the answer book with a string.
6. All working must be clearly shown; it should be done on the same sheet as the rest of the answer.
7. Use of electronic calculators is not allowed.

Answer ALL Questions

1. If $x : y = 3 : 4$, find the value of $\frac{4x - y}{x + y}$ (3 marks)

2. Evaluate $\frac{2}{2\frac{1}{2}} \div (\frac{3}{4} + 1\frac{1}{2})$ (4 marks)

3. In figure 1, ABC is an equilateral triangle and BD = DC.

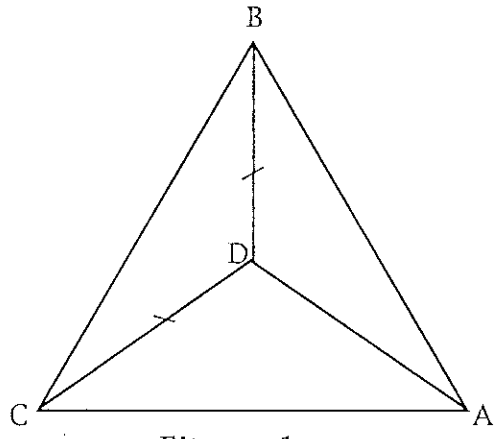

Figure 1

If angle ABD = 25°, calculate angle BDC. (4 marks)

4. A Cyclist takes 3 hours and 30 minutes to travel from Lusako town to Bango town at 15 Km/h. How long will a car travelling at 45 Km/h take for the same journey? (3 marks)

5. The equation of a straight line AB is given by $5x + 2y = 8$.

   Find (a) the gradient of AB. (2 marks)

   (b) the equation of another line passing through the origin parallel to AB. (3 marks)

6. In figure 2, TAD is a tangent at A and AB is parallel to CD.

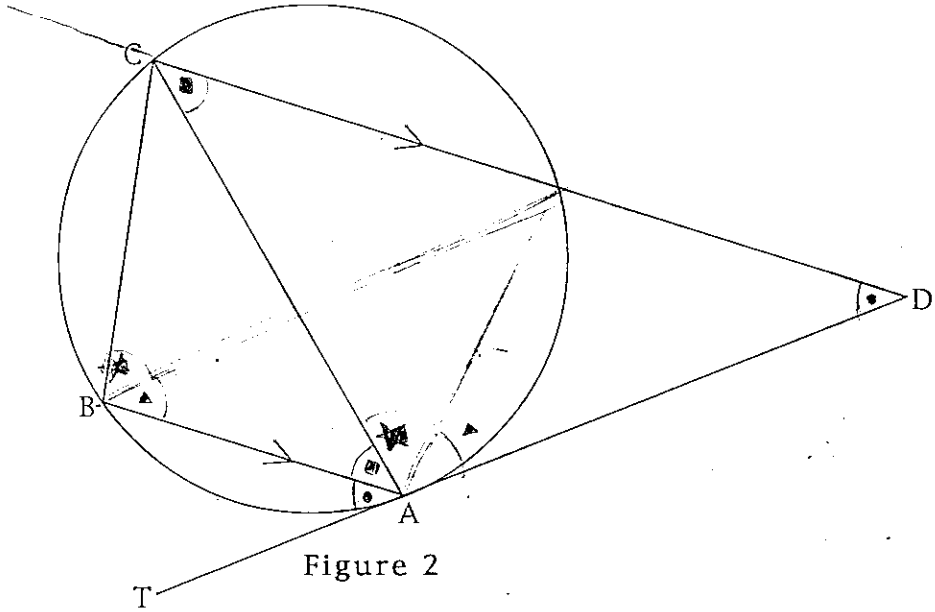

Figure 2

Prove that angle ADC = angle ACB. (3 marks)

Continued ⟶

7. The table below shows the results of a survey taken of the number of passengers in cars passing through Zalewa road block.

No. of passengers	0	1	2	3	4	5
Frequency	11	7	11	8	6	3

(a) Calculate the number of cars recorded in the survey. (2 marks)

(b) Find the mean number of passengers in a car. (2 marks)

8. Draw a circle of radius 3 cm. In the same diagram construct a tangent to the circle at any point. (4 marks)

9. Solve the equation $27^n = 9$. (3 marks)

10. In figure 3, ABCD is a rectangle. P is any point on DC and X is the midpoint of PB.

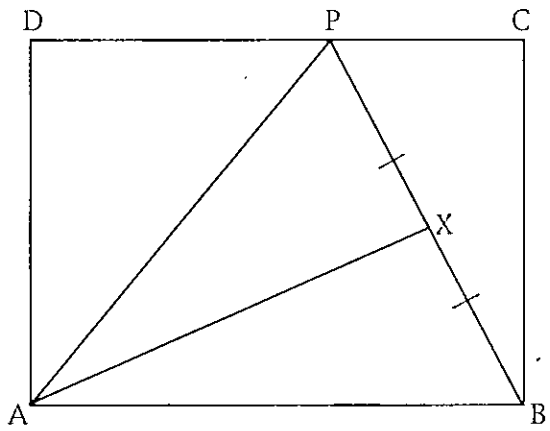

Figure 3

Show that the area of triangle PAX = ¼ area of the rectangle. (3 marks)

11. On the same axis sketch the graphs of the following inequalities:

$y \geq 0$

$y \leq x$

$y \leq 4 - 2x$ (5 marks)

Continued

12. In figure 4, LN is a tangent to the circle ABM. DAM and CBM are straight lines. Angle CDA = 58°.

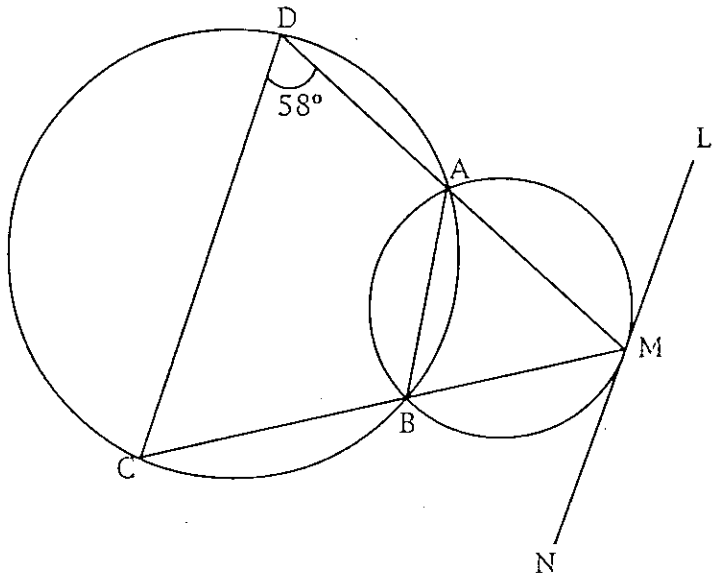

Figure 4

Find angle AML. (3 marks)

13. A refrigerator is sold for K5518.00 at a profit of 24%. What would be the selling price if a profit of 28% was to be made? (4 marks)

14. Factorise completely $(p-q)^2 - 4$. (3 marks)

15. In triangle PQR angle PQR = 90°, PQ = 3.6 cm and angle RPQ = 30°. Calculate QR, correct to three significant figures. (4 marks)

16. A fair die is rolled once. What is the probability of obtaining:

(a) a prime number? (3 marks)

(b) perfect square? (2 marks)

17. Without using tables, evaluate

$\frac{1}{2} \log_{10} 25 - 2 \log_{10} 3 + \log_{10} 180$ (5 marks)

Continued

18. In figure 5, ABCD is a circle, centre O. AOC is a straight line and AB = BD.

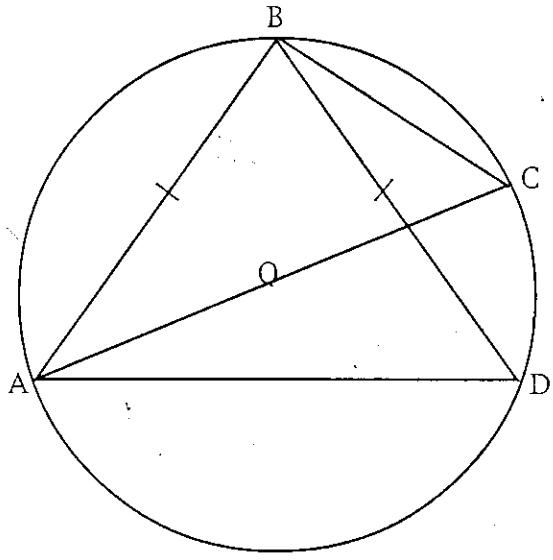

Figure 5

If angle ABD = 70°, Calculate angle BAC. (5 marks)

19. When a polynomial, $x^3 + px^2 - 3x + 4$ is divided by $x + 2$, the remainder is 14. Calculate the value of P. (4 marks)

20. In triangle ABC, AB = 5 cm, AC = 4 cm, BC = 7 cm. Calculate angle BAC. (5 marks)

21. The sum of n terms of an arithmetic progression is $5n^2 - 11n$.
Calculate :

(a) the first term. (2 marks)

(b) the common difference. (3 marks)

22. The volume of a cone is 66 cm^3.

If the height is 7 cm, calculate its radius.
(Take $\pi = \frac{22}{7}$ and Volume of cone $= \frac{1}{3}\pi r^2 h$).

23. In figure 6, ACQ and BCP are straight lines.

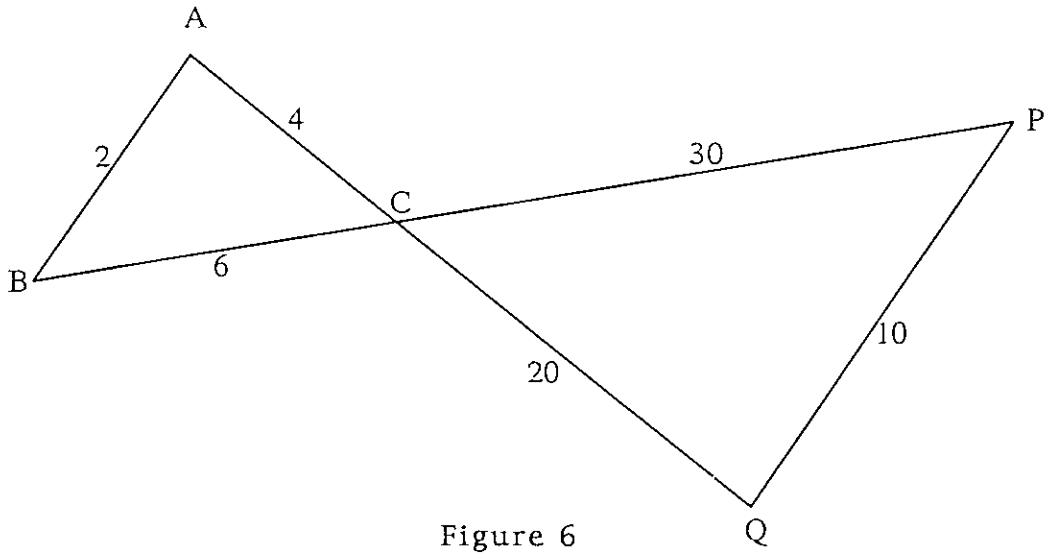

Figure 6

Show that:

(a) triangle ABC is similar to triangle QPC. (4 marks)

(b) AB is parallel to PQ. (2 marks)

24. In figure 7, X is the mid point of AC. AB and XY are both perpendicular to BC.

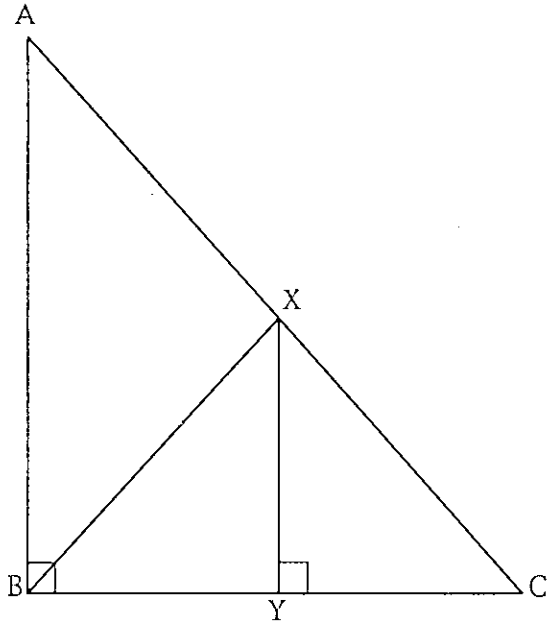

Figure 7

Prove that BX = ½ AC. (6 marks)

END OF QUESTION PAPER