



MATHEMATICS

Subject Number: M131/II

Friday, 5 November

Time Allowed: 2 h 30 min

8:00 – 10:30 am

PAPER II

(100 marks)

Instructions

- This paper contains 19 printed pages. Please check.**
- Answer all the six questions in Section A and any four questions from Section B.**
- The maximum number of marks for each answer is indicated against each question.**
- Write your answers in the spaces provided on the question paper.**
- Scientific calculators may be used.**
- The graph paper at the end of the question paper can be used if required.**
- All working must be clearly shown.**
- Write your Examination Number at the top of each page of your question paper in the spaces provided.**
- In the table 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			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Section A (60 marks)

Answer **all** the **six** questions in this section.

1. a. Simplify $\frac{m^2 - n^2}{n - m}$. **(4 marks)**

b. Given that $(2x^2 - x - 5)(x + 1)$ and $(2x^3 + ax^2 - bx - 5)$ are identical polynomials, find the values of a and b . **(5 marks)**



Continued/...



2. a. The sum of n terms of an Arithmetic Progression (AP) is $\frac{17n - 3n^2}{2}$, find the second term of the AP. (4 marks)

- b. Points **P**, **Q** and **R** are collinear. If $\overrightarrow{PQ} = \begin{pmatrix} 2a - 7 \\ 5 \end{pmatrix}$ and $\overrightarrow{QR} = \begin{pmatrix} 28 - 2a \\ 10 \end{pmatrix}$, find the value of a . (4 marks)

Continued/...



3. a. Solve the equation $-\log_x 2 + \log_x 32 = 4$.

(6 marks)



Continued/...



3. (Continued)

- b. The **Table below** shows a frequency distribution of marks obtained by some students.

Age	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30
Frequency	3	5	7	4	4	1

Calculate the mean mark.

(5 marks)



Continued/...

4. a. Prove the theorem which states that opposite angles of a cyclic quadrilateral are supplementary. (5 marks)

Continued/...



4. (Continued)

- b. Figure 1 shows the graph of a moving object.

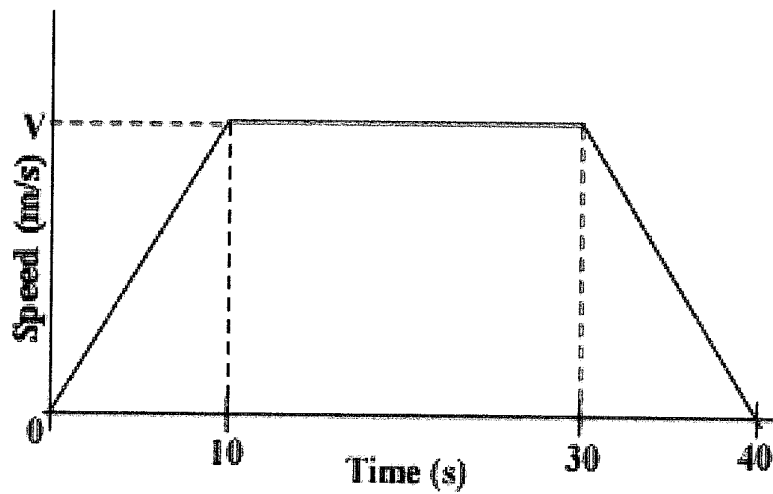


Figure 1

Given that the total distance travelled by the object is 600 m,
calculate the deceleration for the last 10 seconds of the motion.

(5 marks)



5. a. Using a ruler and a pair of compasses only, construct in the same diagram:
- A circle centre **O** and radius 3 cm
 - A point **P** outside the circle such that $OP = 7.5$ cm
 - A tangent **PR** at **R**
- (5 marks)**



Continued/...



5. (Continued)

- b. **Figure 2** is a cuboid in which $PS = 12$ cm, $RS = 5$ cm and $MR = 4$ cm.

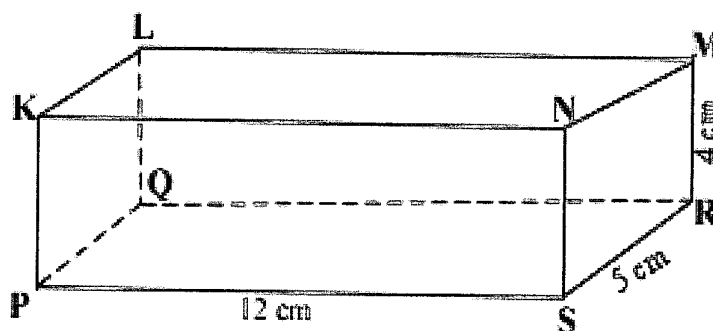


Figure 2

Calculate the angle between LS and KS , giving the answer correct to the nearest degree. **(6 marks)**



6. a. **Figure 3** shows a cyclic quadrilateral **PQRS** in which **SP** and **RQ** are produced to **F** and **G** respectively.

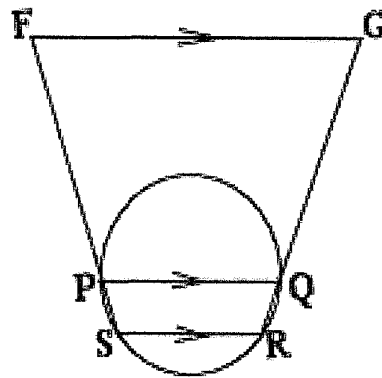


Figure 3

If **FG** is parallel to **PQ** and **SR**, show that **PFGQ** is a cyclic quadrilateral. (5 marks)



6. (Continued)

- b. The probability that Chifundo goes to school on Saturdays is $\frac{1}{4}$.

If he goes to school on Saturday, the probability that he meets his head teacher is $\frac{2}{5}$. When he does not go to school, the

probability that he meets his head teacher is $\frac{1}{7}$. Find the

probability that Chifundo does not meet his head teacher on Saturdays.

(6 marks)

Continued/...



Section B (40 marks)

Answer any **four** questions from this section

7. Solve the following equations simultaneously

$$-2x^2 = 7x - 9$$

$$2y = x + 6$$

(10 marks)



Continued/..



8. The following were the results of a survey of 150 people that was conducted to find out the type of fish they like among Chámbo, Mcheni and Usipa: 80 people like Chambo, 60 like Mcheni and 35 like Usipa; 7 like Chambo and Usipa only, 10 like Chambo and Mcheni only and 5 like Mcheni and Usipa only; 33 do not like any of the three types.
- a. Present the information above in a Venn diagram. **(6 marks)**
- b. Use the Venn diagram to calculate the number of people who like all the three types of fish. **(4 marks)**



Continued/...

9. A student walks 4 km on a bearing of 038° from home (H) to school (S). He then walks 5 km from school on a bearing of 067° to market (M).
- a. Calculate the distance between home and market, giving the answer correct to three decimal places. **(6 marks)**
- b. Calculate the bearing of the market from home, giving the answer correct to the nearest degrees. **(4 marks)**



Continued/...

10. A water bill (B) for a month is partly constant and partly varies as the amount of water (W) used for a month. When 20 m^3 of water is used, the bill is K7 913 and when 32 m^3 is used, the bill is K12 125. Calculate the amount of water used when the bill is K18 443.

(10 marks)



Continued/...

11. Tayamika has K1 500 to spend on buying biscuits and sweets. Biscuits cost K150 each and sweets cost K60 each. She wants to buy at least 4 sweets and spend K300 more on biscuits than sweets.
- Taking x to represent number of biscuits and y to represent number of sweets, formulate **two** inequalities in x and y in addition to $y \geq 4$ that satisfy above information. **(3 marks)**
 - Using a scale of 2 cm to represent 2 units on x -axis and 2 cm to represent 5 units on y -axis, draw graphs on **page 17** to show the region represented by the **three** inequalities. Shade the unwanted region. **(5 marks)**
 - Using the graphs, calculate the maximum number of biscuits and sweets that Tayamika could buy. **(2 marks)**



This image shows a full page of blank graph paper. The grid consists of small squares formed by thin black lines. There are 20 columns and 20 rows of these small squares. The entire page is covered by this grid pattern, with no margins or other markings.

12. **Figure 4** is a graph of a quadratic equation.

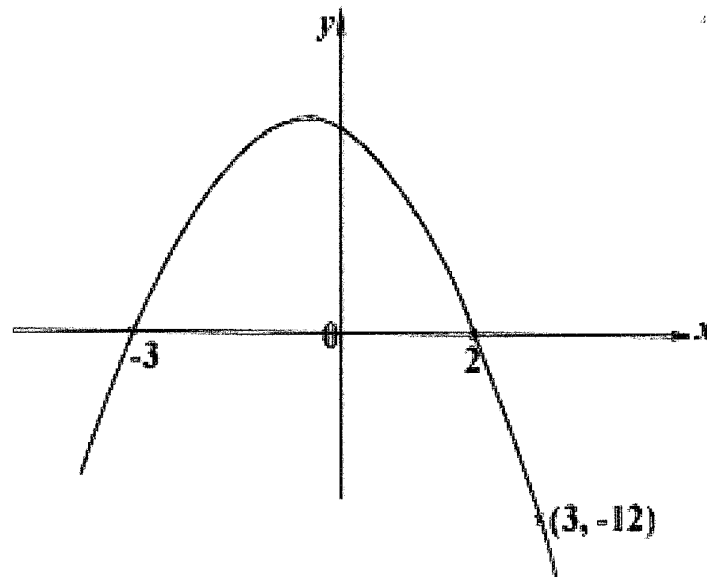


Figure 4

Find the equation of the graph in the form $y = ax^2 + bx + c$.

(10 marks)



Continued/...

12. (Continued)

END OF QUESTION PAPER



NB: This paper contains 19 printed pages.



