



2024 JUNIOR CERTIFICATE EXAMINATION

MATHEMATICS

(100 marks)

Subject Number: J131

Friday, 7 June

**Time Allowed: 2 hours
8:00 – 10:00 am**

Instructions

- 1. This paper contains 15 printed pages. Please check.**
- 2. Answer all the 20 questions in this paper.**
- 3. The maximum number of marks for each answer is indicated against each question.**
- 4. Scientific calculators may be used.**
- 5. The blank answer sheet provided at the end of the question paper can be used if required.**
- 6. All working must be clearly shown.**
- 7. Write your Examination Number on all pages of the question paper in the spaces provided.**
- 8. In the table provided on this page, tick against the question number you have answered.**
- 9. At the end of the examination, hand in your paper to the invigilator.**

Question Number	Tick if answered	Do not write in these columns	
1			
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Answer **all** the **twenty** questions in the spaces provided under each question.

1. a. Simplify $(-4)^2 + 2(-3) + 1$. (4 marks)

b. Given that set $X = \{ \text{first 5 odd numbers} \}$ and
 $Y = \{ \text{prime numbers less than 10} \}$, find $X \cup Y$. (3 marks)



2. a. A motorbike worth K1 000 000 was charged custom duty at the rate of 40%. Calculate the total amount of money that was paid for the motorbike. (3 marks)

b. Simplify $\frac{18a^2bc - 27ab^2c}{9ac}$. (3 marks)



3. a. A basket contains 11 mangoes, 12 bananas, and 7 oranges.
Calculate the probability of picking a banana at random.

(3 marks)

- b. Make x subject of the formula $\frac{1}{2}(x + y)h = A$.

(3 marks)



4. Given that the n th term of a sequence is $\frac{2n^3}{9}$, find the difference between the sixth term and the second term. (4 marks)

5. a. Simplify $(2x - n)(x + n)$. (3 marks)

- b. Simplify $(\sqrt[3]{27})^2 \times 2^3$. (3 marks)



6. Kilombero rice costing K1200 per Kg is mixed with Faya rice costing K800 per Kg. Calculate the ratio that must be used in order for the mixture to cost K1000 per Kg. (4 marks)

7. Figure 1 is a quadrilateral ABCD in which angle $ABC = (6x - 2)^\circ$, angle $BCD = 122^\circ$, angle $DAB = (11x + 12)^\circ$ and angle $CDA = 58^\circ$.

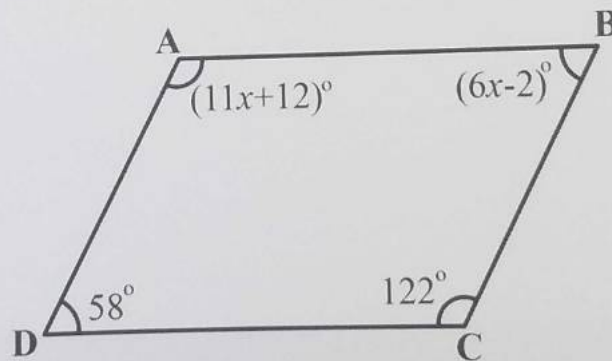


Figure 1

Show that ABCD is a parallelogram.

(5 marks)



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8. Figure 2 shows two similar triangles PQT and PRS in which TQ is parallel to SR , $PR = 12$ cm, $PT = 5$ cm, $ST = 3$ cm and $QT = 3$ cm.

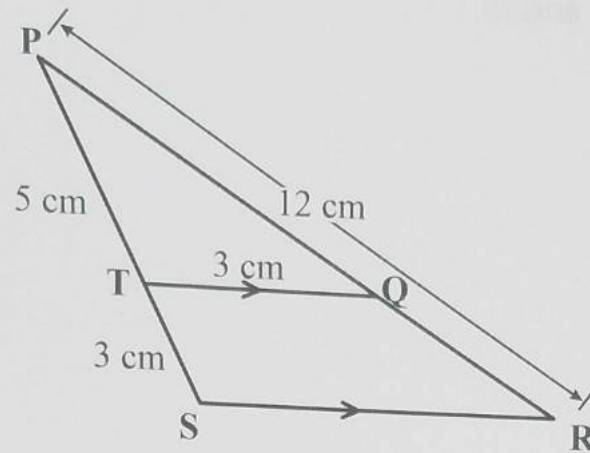


Figure 2

Calculate the length of SR .

(4 marks)

9. Given that the angles y° , $2y^\circ$, $3y^\circ$ and 90° are supplementary, calculate the value of $2y^\circ$.

(5 marks)



10. The difference between two numbers m and n is 4. The sum of m and twice n is 13. Given that the value of m is greater than n , find the values of m and n . (6 marks)

11. Siti bought flour for K17 500, 3 packets of sugar at K1 500 each and 1 carton of soap at K9 000. Given that he paid 16.5% Value Added Tax (VAT), calculate the VAT. (3 marks)



12. Use logarithms to evaluate $4.2^2 \div 1.9$, giving the answer correct to one decimal place. **(5 marks)**
13. James is x years old and Mary is 2 years older than James. The sum of their ages is less than 40. Write down an inequality in x and solve it. **(4 marks)**



14. **Figure 3** shows an object drawn on the graph paper.

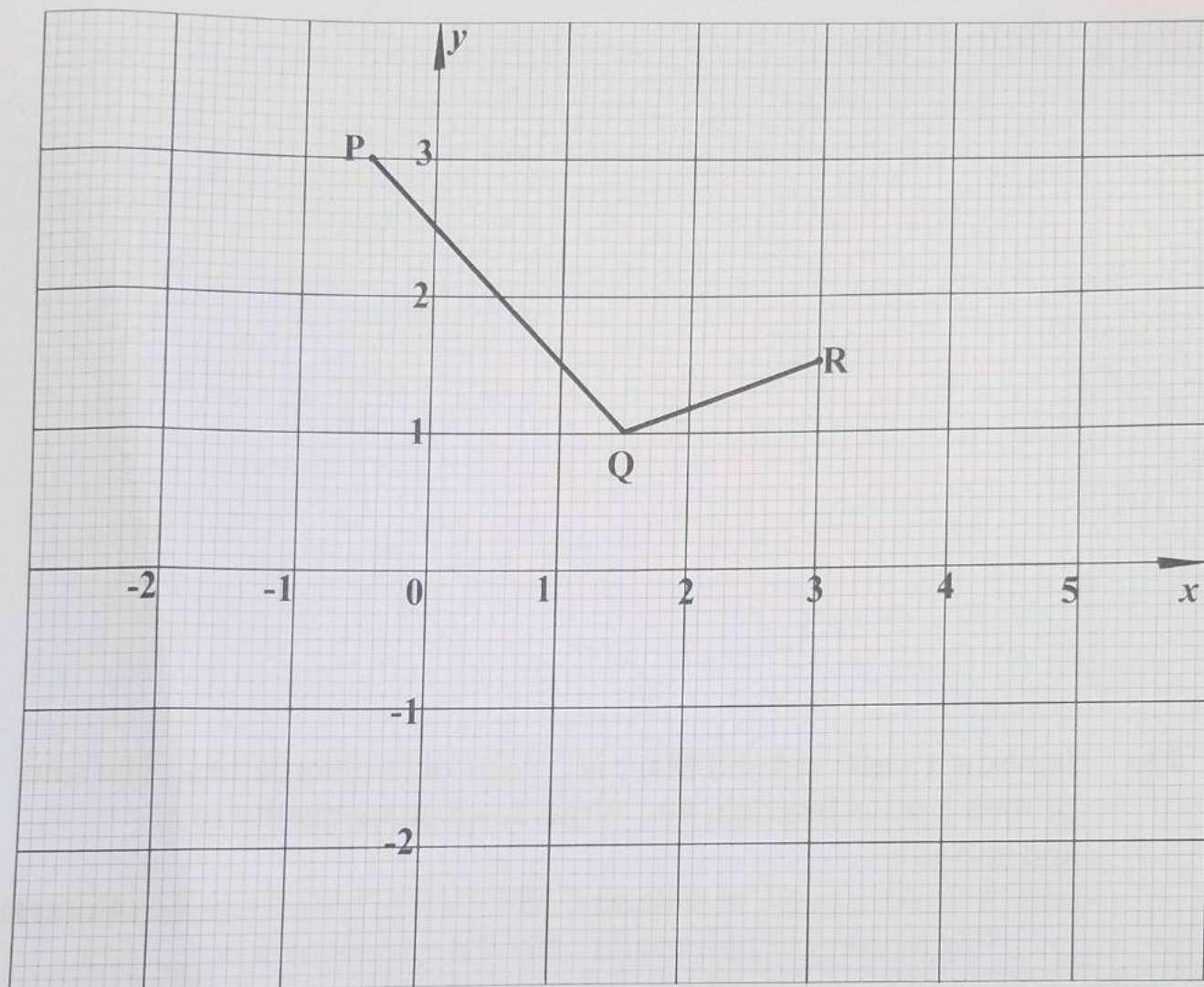


Figure 3

Using $x = 1.5$ as a mirror line, draw a reflection of **PQR**. (3 marks)



2024

15. Solve the equation $4m^2 - 1 = 0$. (5 marks)

16. Find the value of an interior angle of a regular nonagon. (4 marks)



Continued/...

17. Using a pair of compasses and a ruler only, construct rectangle **KLMN** in which **KL** = 6 cm and **LM** = 4 cm. In the same diagram, construct the locus of points inside the rectangle that are 1.5 cm from **KL** and are equidistant from **K** and **M**. Label the locus **O**.

(7 marks)



18. Figure 4 is a graph of a straight line AB.

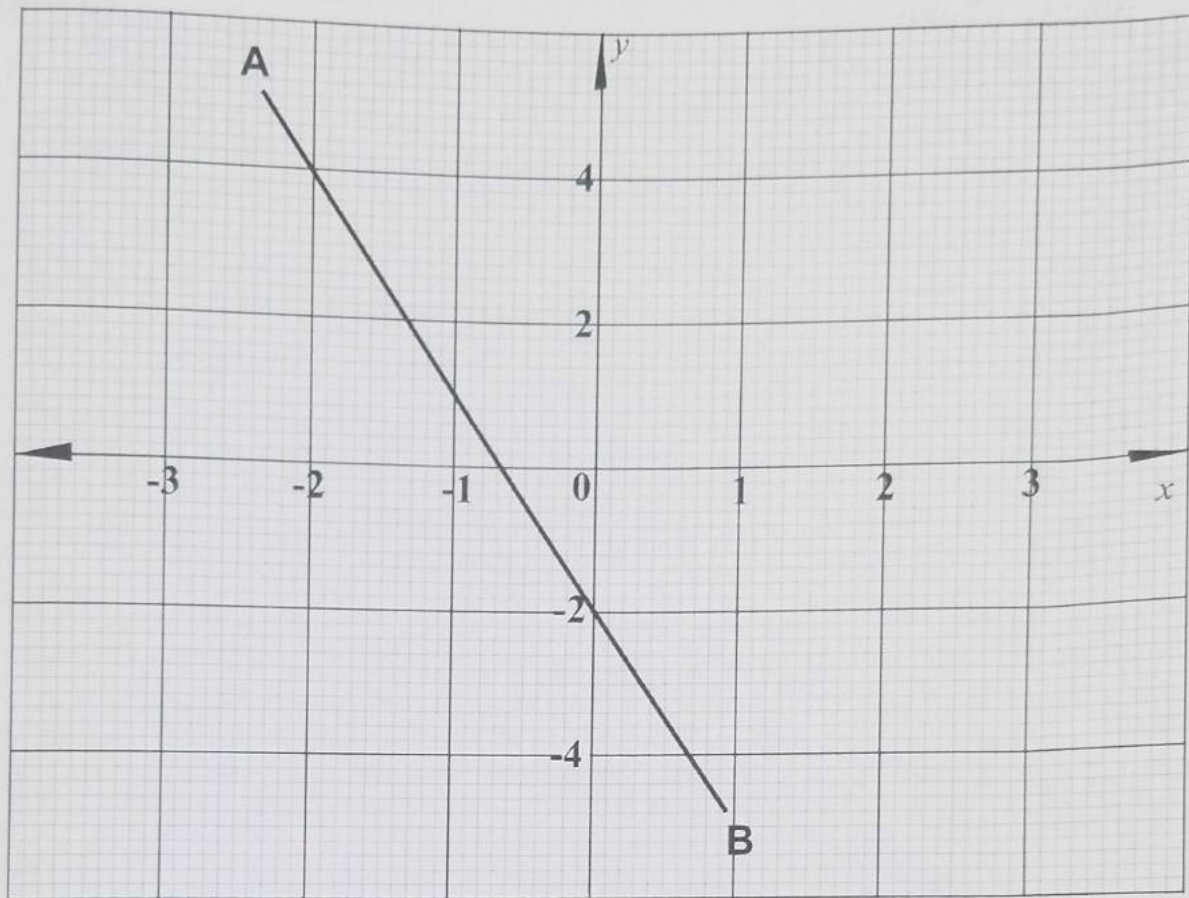


Figure 4

- a. Find the y – intercept. (1 mark)
- b. Find the gradient of line AB. (5 marks)



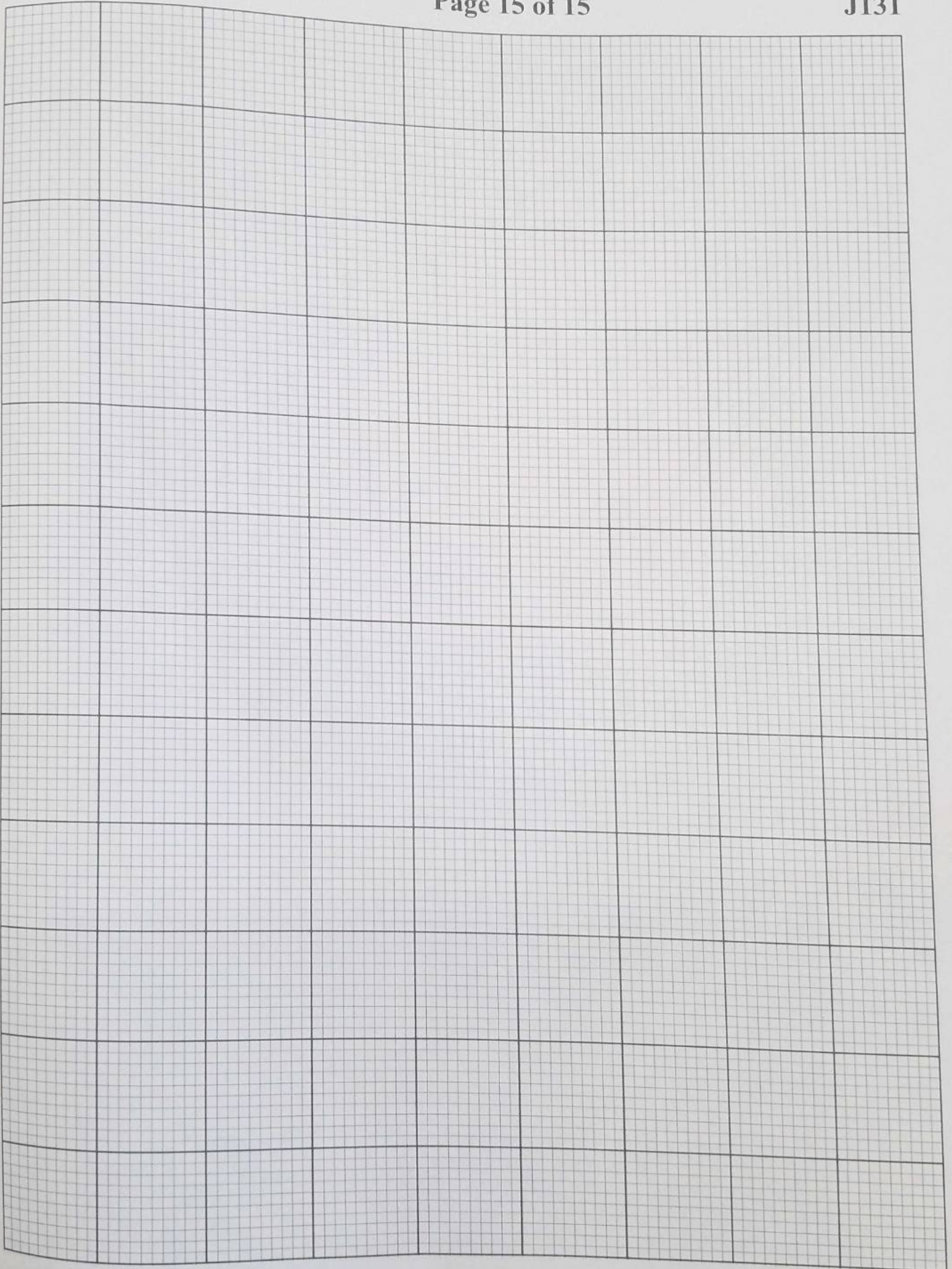
19. Calculate the radius of a cylindrical pipe which is 10 m long and has a surface area of 9.5 m^2 , giving the answer correct to 2 decimal places. (Take $= \frac{22}{7}$). (5 marks)

20. The **table below** shows number of students in hostels **L**, **M** and **N** at Zonse secondary school.

Hostel	L	M	N
Number of students	7	20	14

Using a scale of 2 cm to represent 5 units on the vertical axis, construct a bar chart for the information on the graph paper provided on **page 15**. (5 marks)





END OF QUESTION PAPER

NB: This paper contains 15 printed pages



