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GAUTENG DEPARTMENT OF EDUCATION

MATHEMATICS

GRADE 9 - PROJECT TERM 3

MARKING TOOL

Marks: 50

Date: _____ 2023

Duration: 3 DAYS

Examiner: _____

Moderator: _____

Question	1	2	3	4	Submission on time	TOTAL
Allocated Mark	18	13	9	8	2	50
Obtained mark						

Notes to the the teacher

- Award 2 marks for submission/ finishing in time.
- Allow learners to submit even after submission date but do not award the 2 marks for submission on time.
- Allow learners to consult other resources.
- Administer the project in class.

INSTRUCTIONS AND INFORMATION FOR THE LEARNER

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Number the answers correctly according to the numbering system used in this question paper
3. Clearly show ALL calculations which you have used in determining your answers where required.
4. Round off all final answers to two decimal places where it is required unless stated otherwise.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. Answers only will not necessarily be awarded full marks.
7. Note that diagrams are not necessarily drawn to scale.

8. You are allowed to consult additional resources.
9. Write neatly and legibly.

OBJECTIVE

Use transformation of objects involving graphs; numeric and geometric patterns in the context of housing in a community.

ASSESSMENT CRITEREA

Criterea	Mark
1. Ability to relate classroom content to real life situations	7
2. Application of Mathematical concepts in real life situations	14
3. Substantiation of data.	9
4. The recollection of Mathematics	18
5. Submission on time	2

THE PROBLEM STATEMENT

The community of Tshwaranang in Ekurhuleni is having challenges with housing for its community members. The municipality has identified land where houses should be built. You are the town planner. Solve this problem by doing the following project.

QUESTION 1

In this township each street will have 6 street lights; on the one side of the street on pavements of the houses. The last street light will be on the last house of the side of the street.

The 1st street light will be on the 5th house's pavement; the 2nd on the 9th house pavement; the 3rd on the 13th house's pavement and the 4th on the 17th house's pavement.

1.1. Indicate first 4 of the number sequence in this pattern in terms of the number of house where the street light is positioned and find the constant difference.

- a) 5; 9; 13; 17; ✓ [2]
 b) The constant difference is 4. ✓

1.2 Draw a table to indicate the position of the street light against the number of street light it is.

X (position of the term)	1	2	3	4
Y (constant difference by position of the term)	5	9	13	17

[2]

1.3. Identify the relationship between the position and the number of lights there are and write in words.

To get the actual term; we first find the constant difference and multiplied the position of the term by the constant difference then we add 1. [1]

1.4. Establish the formular/ rule used to position the street lights algebraically.

$$y = 4x + 1 \quad [1]$$

1.5. How many houses will be in each side of the street? Show calculations

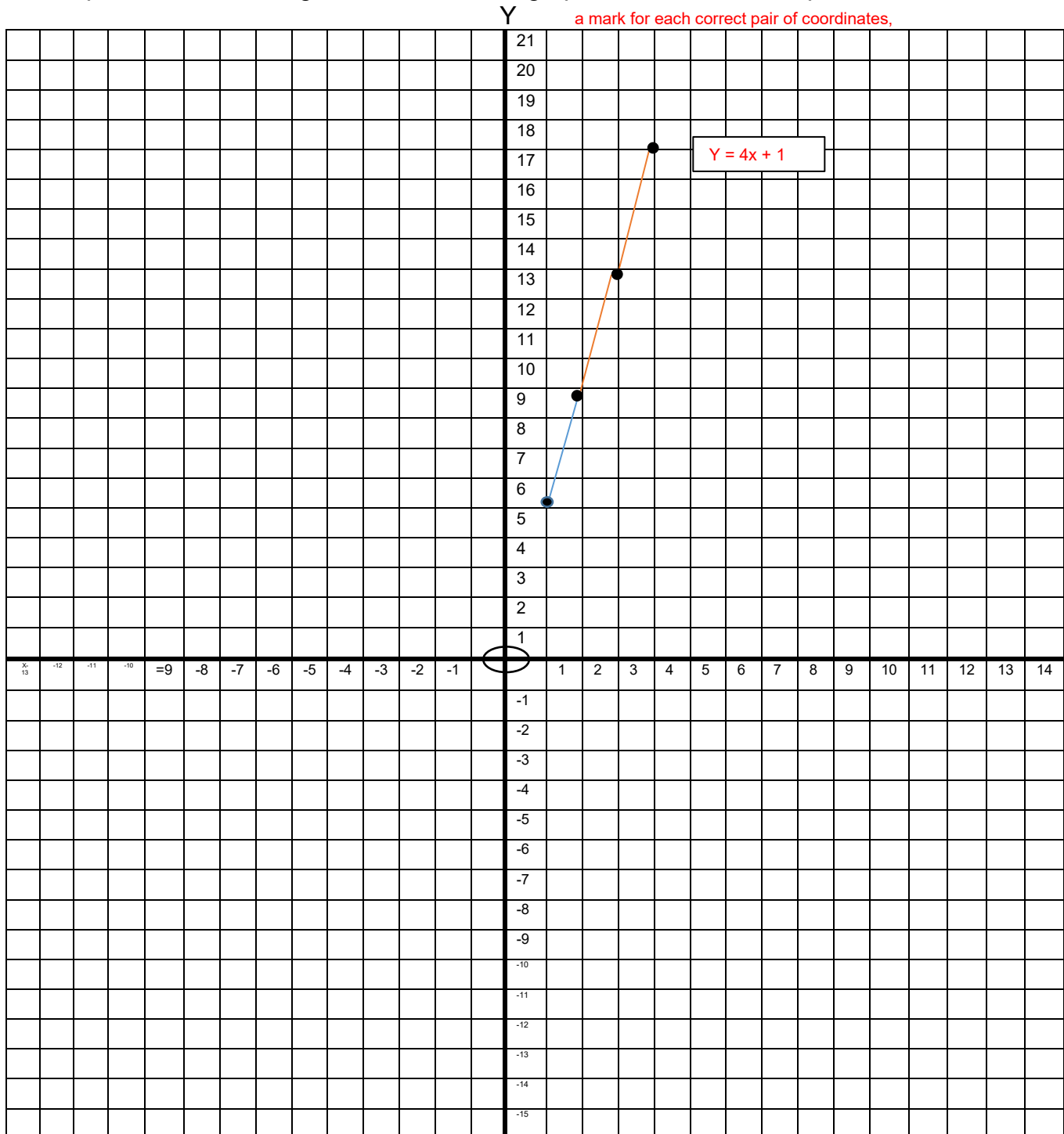
$$y = 4x + 1 \checkmark$$

$$y = 4(6) + 1 \checkmark$$

$$y = 25 \checkmark$$

∴ There are 25 houses on the one side of this street. [3]

1.6 .Represent the street light information on a graph. Use the cetacean plane below.



[4]

1.7 What is the gradient of this graph?

$$M = \frac{\Delta Y}{\Delta X} \checkmark$$

$$\frac{17-5}{4-1} \checkmark$$

$$= 4 \checkmark$$

[3]

1.8 In this graph what will happen to the value of y when the value of x decrease?

A+

The value of y will decrease

[1]

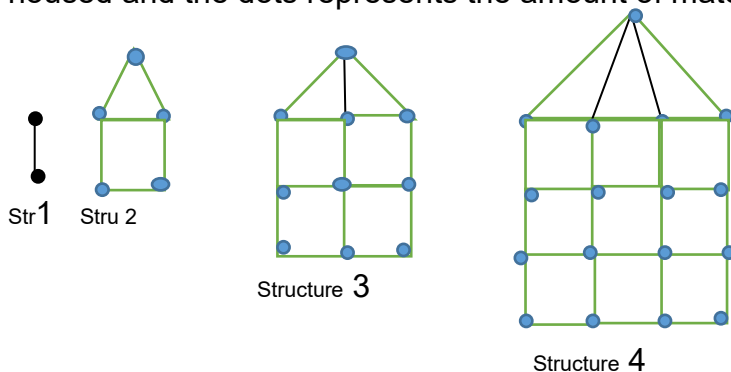
1.9 State whether the graph is an increase; a decrease or a constant.

Increase

[1]

QUESTION 2

You are considering the different patterns and structures of houses and considering the number people and resources that will be needed. The squares represent the number families that can be housed and the dots represents the amount of material that can be used to build each structure

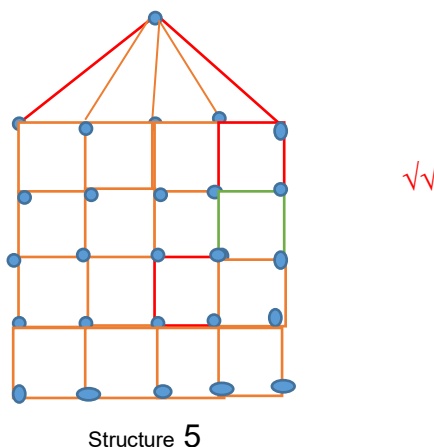


2.1. Count the material to be used in each structure

- a) Structure 1 – 2 dots ✓
- b) Structure 2 – 5 dots ✓
- c) Structure 3 – 10 dots ✓
- d) Structure 4 – 17 Dots ✓

[4]

2.2. What will the structure 5 look like. Draw below



[2]

2.3. Count the number of dots in Structure 5 _____

26ots.

[1]

2.4 How much material/dots will you need to house 25 families?

37 dots

[1]

2.5. How many dots/material are there in Structure 6?

50 dots.

2.6. Describe the pattern from structure 1 to Structure 4.

Square the position of the structure and add 1 dot

[1]

2.7. Determine the general rule to find the number of dots in the n^{th} Structure.

$$T_n = n^2 + 1$$

[1]

2.8. Use the rule to calculate many dots are there in the 50th Structure? Show calculations.

$$\begin{aligned} T_{50} &= 50^2 + 1 \\ &= 2501 \end{aligned}$$

[2]

2.9. From the structures above. Which structure will you use and why? Present your answer basing it on your answers above.

I will use the structure that houses a lot of families on a small space like structure 4 and 5 [1]

QUESTION 3

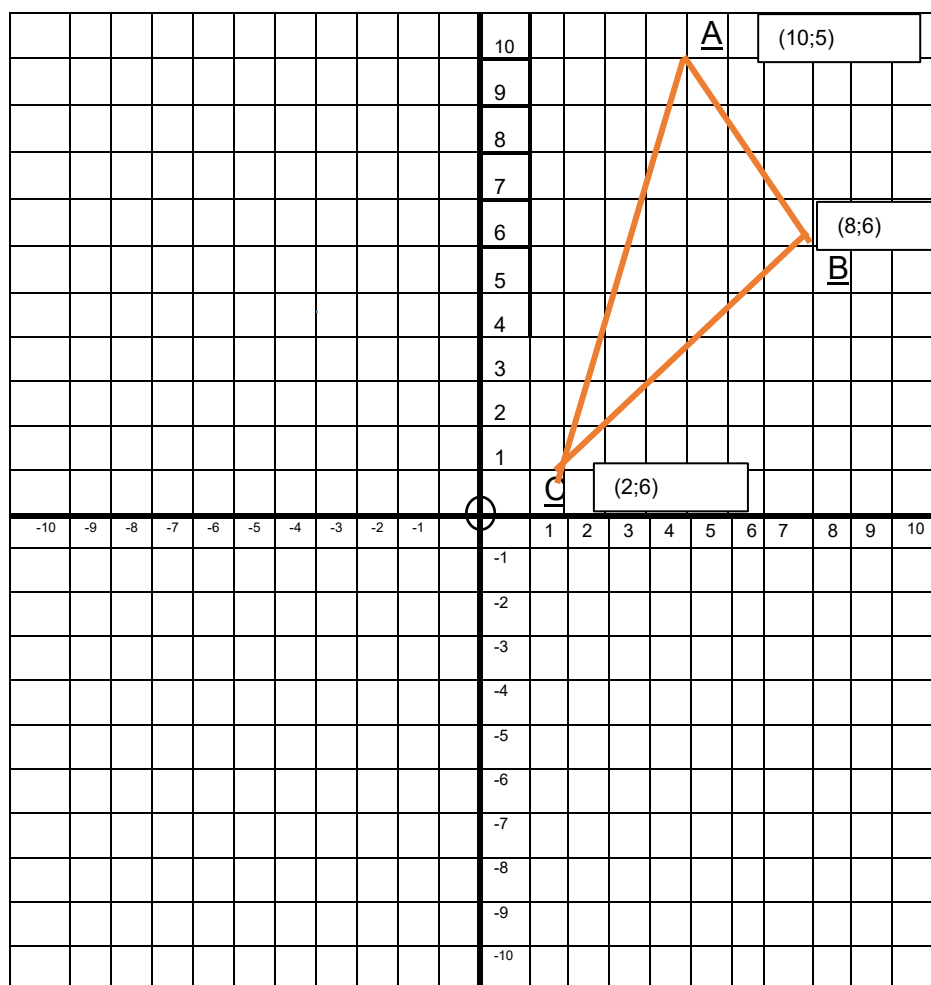
3.1. Triangle R on the Cartesian plane below represents a roof for one unit. To extend the roof to cater for 16 unit you need to enlarge the roof using $(y + 3 ; x + 3)$. Calculate the coordinates of the enlarged roof.

$$\begin{aligned} &\text{on } (y + 3 ; x + 3) \\ \text{For set A} &= (2 + 3 ; 7 + 3) \checkmark \\ &= (5 ; 10) \checkmark \end{aligned} \quad [2]$$

$$\begin{aligned} \text{For Set B} &= (5 + 3 ; 3 + 3) \checkmark \\ &= (8 ; 6) \checkmark \end{aligned} \quad [2]$$

$$\begin{aligned} \text{For Set C} &= (-1 + 3 ; 3 + 3) \checkmark \\ &= (2 ; 6) \checkmark \end{aligned} \quad [2]$$

3.2. Use a different colour to draw the enlarged roof. On the Cartesian plane below

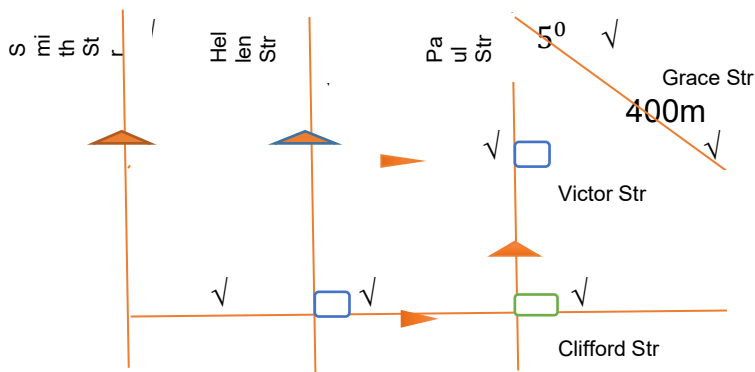


A mark is allocated for each correct coordinate on the enlarged and reflected coordinates [3]

QUESTION 4

Draw a plan of the streets of this township with Paul Street perpendicular to Victor Street, Grace Street connects Victor Street and Paul Street at 45° at each vertex and forms a triangular park. Hellen Street is parallel to Paul Street and parallel to Hellen Street is Smith Street. Parallel to Victor Street is parallel to Clifford Street. Clifford Street intersects Paul; Hellen and Smith Streets at 90° angles.

NB. All the streets are 800m long except Grace Street which is half of the Paul Street. Draw to the scale of $100\text{m} = 10\text{ mm}$.

**[8]**