**GAUTENG DEPARTMENT OF EDUCATION**

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| MATHEMATICS **GRADE 9 - PROJECT TERM 3** |

**Leaners’ name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class \_\_\_\_\_\_**

**Marks:** 50

**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_ 2021

**Duration:**  3 DAYS

**Examiner:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Moderator: \_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- | --- | --- | --- | --- |
| **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 submitt 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.**

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**INSTRUCTIONS AND INFORMATION TO 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

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| Criteria | 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. [2]

1.2 Indicate in the table the position of the street light against the number of street light it is.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X (position of the term) |  |  |  |  |
| Y(constant difference by position of the term ) |  |  |  |  |

[2]

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

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[1]

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1]

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

. [3]

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

Y

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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[4]

1.7 What is the gradient of this graph?

[3]

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

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [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

Str1 Stru 2

Structure 3

Structure 4

2.1. Count the material to be used in each structure

a) Structure 1 - \_\_\_\_\_\_\_\_\_\_\_

b) Structure 2 - \_\_\_\_\_\_\_\_\_\_\_

c) Structure 3 - \_\_\_\_\_\_\_\_\_\_\_

d) Structure 4 - \_\_\_\_\_\_\_\_\_\_ [4]

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

[2]

Structure 5

2.3. Count the number of dots in Structure 5 : \_\_\_\_\_\_\_ [1]

2.4 How much material/dots will you need to house 25 families? \_\_\_\_\_\_\_\_\_\_\_\_ [1]

2.5. How many dots/material are there in Structure 6? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1]

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1]

2 7. Determine the general rule to find the number of dots in the Structure.

[1]

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

[2]

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**QUESTION 3**

3.1. Triangle ABC 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.

Pair 1

[2]

Pair 2

[2]

Pair 3

[2]

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  | 3 |  |  | |  | B |  | (5;3) | |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  | 2 |  |  | |  |  |  |  | |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  | (-1;3) |  |  | 1 |  |  | |  |  |  |  | | A | | (7;2) | |  | |  | |
|  |  |  |  |  |  |  |  |  | C |  |  |  |  | |  |  |  |  | |  | |  | |  | |  | |
| -10 | -9 | -8 | -7 | -6 | -5 | -4 | -3 | -2 | -1 |  |  | 1 | | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | | 9 | | 10 | |
|  |  |  |  |  |  |  |  |  |  |  | -1 |  | |  |  |  |  |  |  | |  | |  | |  | |
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|  |  |  |  |  |  |  |  |  |  |  | -4 |  | |  |  |  |  |  |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  | -5 |  | |  |  |  |  |  |  | |  | |  | |  | |
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[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 45⁵ 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 90ᵒ angles.

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

Smith Str

Hellen Str

Paul Str

√ √

√

Grace Str

400m

√ √

Victor Str

√ √ √ [8]

Clifford Str