

**MATHEMATICS**

**GRADE 9**

**TERM 3 2021**

**EXEMPLAR PROJECT**

**TRANSFORMATION GEOMETRY**

**TRANSFORMATION GEOMETRY**

**DATE: TERM 3 2021**

**TIME: 3 HOURS**

**TOTAL: 50**

**NAME OF LEARNER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ GRADE 9: \_\_\_**

**TRANSFORMATION GEOMETRY**

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| **TIME:** | Three periods each 1 hour |
| **TARGET AUDIENCE:** | Grade 9 learners |
| **REQUIRED PREVIOUS KNOWLEDGE:** | How to plot points on a coordinate graph. |
| **REQUIRED MATERIALS:** | Rulers, graph paper, pencils |

* This project includes a review of translations and reflections on the coordinate grid.
* Learners will investigate the rules used for various transformations.
* Learners will be assessed on the graphs that they create and the conclusions that they draw about the rules for each transformation.

**CREATING YOUR OWN IMAGE**

**To create your own image, you will use:**

* Your name
* A coordinate grid
* Transformations

**GETTING STARTED:**

**STEP ONE**

In the name chart :

* Write the **first 6 letters** of your **first name**. If your name is less than 6 letters long, start over on your name.
* Write in the first 6 letters of your **surname**. Again, if you need more letters start over at the beginning of your name.

Example: **First name**: KIAN **Surname**: NEVAN

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| --- | --- |
| **NAME CHART** | |
| **FIRST NAME** | **SURNAME** |
| **K** | **N** |
| **I** | **E** |
| **A** | **V** |
| **N** | **A** |
| **K starts again from beginning of name** | **N** |
| **I** | **N starts again from beginning of name** |

**STEP TWO**

* Use the letter-to-number conversion chart to get the coordinates for your original shape.
* The coordinate comes from the first name and the coordinate comes from the surname.
* If any ordered pairs duplicate, switch the x- and y-coordinates (of the second set of duplicated ordered pair) so that all coordinate pairs are unique.

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| **LETTER TO NUMBER CONVERSION CHART** | |
| **LETTER** | **NUMBER** |
| **AB** | **-1** |
| **CD** | **-2** |
| **EF** | **-3** |
| **GH** | **-4** |
| **IJ** | **-5** |
| **KL** | **-6** |
| **MN** | **0** |
| **OP** | **6** |
| **QR** | **5** |
| **ST** | **4** |
| **UV** | **3** |
| **WX** | **2** |
| **YZ** | **1** |

Example:

|  |  |  |
| --- | --- | --- |
| **COORDINATES** | | |
| **x** | **y** | **ORDERED PAIR** |
| **-6** | **0** | **(-6,0)** |
| **-5** | **-3** | **(-5,-3)** |
| **-1** | **3** | **(-1,3)** |
| **0** | **-1** | **(0,-1)** |
| **-6** | **0** | **(-6,0) repeated so changes to (0,-6)** |
| **-5** | **0** | **(-5,0)** |

**STEP THREE**

* Plot the ordered pairs of your original shape on the grid provided.
* Connect the points along the perimeter of the shape.
* Make sure your points are connected to form a closed figure. (This may mean

that points are not connected in order.)

**Pat yourself on the back … you're doing great!**

**PROJECT INSTRUCTIONS**

1. **Use the original closed shape that you have created.**
2. **Transformation 1 : Translation (x + 3 , y – 3 )**

**A translation is taking the original image and sliding it without turning it.**

* Graph your original shape again.
* Now translate the shape as indicated.
* Find the coordinates for the image. (The new resulting shape)
* Graph the image on the coordinate graph.

1. **Transformation 2 : Translation (x - 2 , y + 2 )**

**A translation is taking the original image and sliding it without turning it.**

* Graph your original shape again.
* Now translate the shape as indicated.
* Find the coordinates for the image. (The new resulting shape)
* Graph the image on the coordinate graph.

1. **Transformation 3 : Reflection in the x–Axis**

**A reflection is taking the original image and flipping it along a line of reflection.**

* Graph your original shape again.
* Now reflect the shape in the x-axis
* Find the coordinates for the image. (The new resulting shape)
* Graph the image on the coordinate graph.

1. **Transformation 4 : Reflection in the y–Axis**

**A reflection is taking the original image and flipping it along a line of reflection.**

* Graph your original shape again.
* Now reflect the shape in the y - axis.
* Find the coordinates for the image. (The new resulting shape)
* Graph the image on the coordinate graph.

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1. **Your IMAGE : Now to make your image, which will represent you.**

• Graph your original shape.

• Perform a sequence of **TWO unique transformations** on your original image.

• Your emblem will consist of THREE figures:

* Figure 1: Your original shape
* Figure 2: Your original shape transformed using a translation
* Figure 3: The image transformed using a reflection

• Clearly explain the sequence of transformations that you used to obtain your

image.

• Colour or decorate the image.

• Think of a slogan or motto to go with your image and write it in the space

provided.

**FIRST NAME :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SURNAME : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Name chart**

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| **NAME CHART** | |
| **FIRST NAME** | **SURNAME** |
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| **COORDINATES** | | |
| **x** | **y** | **ORDERED PAIR** |
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1. **Coordinate**

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| --- | --- |
| **LETTER TO NUMBER CONVERSION CHART** | |
| **LETTER** | **NUMBER** |
| **AB** | **1** |
| **CD** | **2** |
| **EF** | **3** |
| **GH** | **4** |
| **IJ** | **5** |
| **KL** | **6** |
| **MN** | **7** |
| **OP** | **8** |
| **QR** | **9** |
| **ST** | **10** |
| **UV** | **11** |
| **WX** | **12** |
| **YZ** | **13** |

1. **Original shape**



1. **Transformation 1 : Translation (x + 3 , y – 3 )**

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| **COORDINATES:ORIGINAL SHAPE** | | | **COORDINATES:TRANSLATED IMAGE** | | |
| **x** | **y** | **ORDERED**  **PAIR** | **X’** | **Y’** | **ORDERED PAIR** |
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1. **Transformation 2 : Translation (x - 2 , y + 2 )**

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| **COORDINATES:ORIGINAL SHAPE** | | | **COORDINATES:TRANSLATED IMAGE** | | |
| **x** | **y** | **ORDERED**  **PAIR** | **X’** | **Y’** | **ORDERED PAIR** |
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1. **Transformation 3 : Reflection in the x–Axis**

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| **COORDINATES:ORIGINAL SHAPE** | | | **COORDINATES:REFLECTED IMAGE** | | |
| **x** | **y** | **ORDERED**  **PAIR** | **X’** | **Y’** | **ORDERED PAIR** |
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1. **Transformation 4 : Reflection in the y–Axis**

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| **COORDINATES:ORIGINAL SHAPE** | | | **COORDINATES:REFLECTED IMAGE** | | |
| **x** | **y** | **ORDERED**  **PAIR** | **X’** | **Y’** | **ORDERED PAIR** |
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1. **Your IMAGE : Now to make your image, which will stand for you.**

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| **COORDINATES:ORIGINAL SHAPE** | | | **COORDINATES:TRANSLATED IMAGE** | | | **COORDINATES:REFLECTED IMAGE** | | |
| **x** | **y** | **ORDERED**  **PAIR** | **X’** | **Y’** | **ORDERED PAIR** | **X’’** | **Y’’** | **ORDERED PAIR** |
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Describe the sequence of transformations in your IMAGE:

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Your Motto:

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**Well done! … you're reached the end!**

**Total : 50**