**FLE Mathematics - Term 2, 2025**

**Geometry city planning and branding project**

**Background**

Across Term 2 you have been developing geometry and angle reasoning. You will use your skills to complete 3 parts of this project:

1. planning a suburb
2. maintaining a suburb
3. research and designing logos

**Part 1: Planning a suburb**

1. Define, draw and label images to explain each of the following:

|  |  |  |
| --- | --- | --- |
|  | Worded definition | Labelled image |
| Parallel lines |  |  |
| Transversal lines |  |  |
| Vertically opposite angles |  |  |
| Alternate angles |  |  |
| Corresponding angles |  |  |
| Co-interior angles |  |  |
| Supplementary angles |  |  |
| Complementary angles |  |  |

You have been hired to plan a new suburb and have being given creative freedom as long as your plan follows the guidelines below.

You will need A4 or A3 paper, ruler, pencil, eraser, highlighters/textas/coloured pencils.

1. **Set up your suburb plan – mark  each feature when completed:**

At least 4 parallel streets – all are parallel to each other

At least 3 transversals – they do not have to be parallel to each other but should not overlap each other

All streets must be labelled with appropriate names - math-themed or otherwise appropriate

Highlight every intersection angle using different colours to represent each angle type:

* + Acute – colour \_\_\_\_\_\_
  + Obtuse – colour \_\_\_\_
  + Right - colour \_\_\_\_

1. **Add labelled points of interest to your suburb plan – mark  each feature when completed:**

Two pairs of locations at **vertically opposite angles**

a fire station (FS) and a school (S) located at vertically opposite angles

a car dealership (CD) and sports oval (SO) located at vertically opposite angles

Two pairs of locations at **alternate angles**

a petrol station (PS) and a library (L) located at alternate angles

a church (C) and a park (P) located at alternate angles

Two pairs of locations at **corresponding angles**

a swimming pool (SP) and a kindergarten (K) located at corresponding angles

a movie theatre (MT) and a supermarket (SU) located at corresponding angles

Two pairs of locations at **co-interior angles**

a police station (PO) and a restaurant ( R) located at co-interior interior angles

a post office (POST) and a hospital (H) located at co-interior interior angles

Two pairs of locations at **supplementary angles**

a café (CA) and a skate park (SK) located at supplementary angles

2 establishments of your choice located at supplementary angles:

I chose to add a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the map.

**Part 2: Maintaining a suburb**

With every suburb, there are maintenance issues that need to be addressed and improved. Your next challenge will be identifying where problems are occurring in your suburb using a Cartesian plane and fixing each problem by using an appropriate solution through transformation. All solutions will be dispatched from the suburb headquarters at the origin (0,0).

You will need A4 grid paper, ruler, pencil, eraser, scissors

Draw and label a cartesian plane with x values (-8 to 8) and y values (-12 to 12).

1. Locate and label the following suburban problems on the Cartesian plane:

|  |  |  |
| --- | --- | --- |
| **Problem** | **Coordinate** | **Label** |
| Sewerage leak | (4,3)  (-5,-4)  (-6,7)  (3,6) | S1  S2  S3  S4 |
| NBN breakdown | (-3,5)  (-4,-6)  (7,-3)  (2,8) | N1  N2  N3  N4 |
| Weeds | (6, 5)  (-5, 9)  (-2, -2)  (4, -2) | W1  W2  W3  W4 |

1. Draw and cut out each solution shape. Solutions can only move in certain ways as listed in the transformation column. Draw **one** coloured dot on the edge of each shape – this will be the point placed on the origin and will allow you to track your transformations to reach the problem. All solutions start with the dot at the origin (0,0).

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Solution** | **Shape** | **Transformation** |
| Sewerage leak | Plumber  Label -> P | Circle  – 2 grid diameter | Translation (up, down, left, right) |
| NBN breakdown | Telecommunications  Label -> T | Rectangle  – 3 grid length by 2 grid wide | Translation and reflection on the x axis  To cross the x axis, reflection only |
| Weeds | Weed sprayer  Label -> W | Trapezium  – 3 grid lengths wide by 2 grid lengths high | Translation and reflection on the y axis  To cross the y axis, reflection only |

1. Write the transformation required to reach or cover each problem **in order** with any part of the solution. You need to reach each problem in sequence ie. S1 then S2 then S3 then S 4. Transformation sequences can be written as A(x,y) -> A'(x+h, y+k)

**Sewerage leak**

Plumber transformation - Translation (up, down, left, right)

|  |  |  |
| --- | --- | --- |
| Problem | Describe the transformation in words | Describe the transformation in coordinate notation  S1(x, y) - > S1’(x’, y’) |
| S1 |  |  |
| S2 |  |  |
| S3 |  |  |
| S4 |  |  |

**NBN breakdown**

Telecommunications transformation - Translation and reflection on the x axis - To cross the x axis, reflection only

|  |  |  |
| --- | --- | --- |
| Problem | Describe the transformation in words | Describe the transformation in coordinate notation  A(x, y) - > A’(x’, y’) |
| N1 |  |  |
| N2 |  |  |
| N3 |  |  |
| N4 |  |  |

**Weeds**

Weed sprayer transformation - Translation and reflection on the y axis - To cross the y axis, reflection only

|  |  |  |
| --- | --- | --- |
| Problem | Describe the transformation in words | Describe the transformation in coordinate notation  A(x, y) - > A’(x’, y’) |
| W1 |  |  |
| W2 |  |  |
| W3 |  |  |
| W4 |  |  |

**Part 3: Research and designing logos**

1. Define, draw and label images of the following:

|  |  |  |
| --- | --- | --- |
|  | Worded definition | Labelled image |
| Translation |  |  |
| Reflection |  |  |
| Rotation |  |  |
| Dilation |  |  |

1. Everywhere you look you will find company logos and trademarks. Some are easily recognisable and help you find their company, product or service quickly.

Search the internet for common, well known logos.

Make a Powerpoint of the following:

* 1. Two logos with a translation - describe the translation
  2. Two logs with a reflection - describe the reflection
  3. Two logos with a rotation - describe the angle of rotation

1. Create a name for your suburb then design a logo for your suburb. It must use a reflection, rotation or translation. You will use A4 grid paper, ruler, pencil, eraser, highlighters/textas/coloured pencils
   1. Describe the transformation is used in your logo
   2. Draw your logo on a Cartesian plane and show the transformation
   3. Include a list of pre-image coordinates and image coordinates