<u>**M7G2a:**</u> **Demonstrate understanding of translations, rotations, reflections, and relate symmetry to appropriate transformations.** <u>**M7G2b:**</u> **Given a figure in the coordinate plane, determine the coordinates resulting from a translation, dilation, rotation, or reflection**

Kente Cloth Design Mathematical Coat of Arms

<u>**Background:**</u> Kente cloth originated with the Ashanti, a major ethnic group in Ghana, in the 12th century. Legend has it that Kente was first made by two friends who went hunting in a forest and found a spider making a web. The friends stood and watched the spider for two days then returned home and began their own weavings. Kente is a royal and sacred cloth worn only in times of extreme importance; the cloth of kings. Over time, the use of Kente became more widespread; however, it continues to be important and held in high esteem throughout Ghana. Kente is the best known of all African textiles and is identified by its dazzling, multicolored patterns of bright colors, geometric shapes, and bold designs.

The colors used in Kente cloth have the following symbolic meanings:

- black -- maturation, intensified spiritual energy
- blue -- peacefulness, harmony and love
- green -- vegetation, planting, harvesting, growth, spiritual renewal
- gold -- royalty, wealth, high status, glory, spiritual purity
- grey -- healing and cleansing rituals; associated with ash
- maroon -- the color of mother earth; associated with healing
- pink -- assoc. with the female essence of life; a mild, gentle aspect of red
- purple -- assoc. with feminine aspects of life; usually worn by women
- red -- political and spiritual moods; bloodshed; sacrificial rites
- silver -- serenity, purity, joy; assoc. with the moon
- white -- purification, sanctification rites and festive occasions
- yellow -- preciousness, royalty, wealth, fertility

(Source: Wikipedia.org.)

The Project:

For this project, you will use both your first and last names in your design. To build the design you will use the coding system below:

0	1	2	3	4	5	6	7	8	9	10
A	B	C	D	E	F	G	H	I	J	K
L	M	N	O	P	Q	R	S	T	U	V
W	X	Y	Z							

Follow the example to code both your first and last names:

I	R	Write your first name vertically
R	E	and end the first column with
E	N	the first letter of your first
N	E	name. The second column
E	I	continues your first until the
I	R	columns are the same length.

I R	→	(8,6)	Use the code above to form	J O	→	(9,3)
R E	→	(6,4)	ordered pairs that represent	O V	→	(3,10)
E N	→	(4,2)	your first name.	V E	→	(10,4)
N E	→	(2,4)	Use the same method to write,	E L	→	(4,0)
E I	→	(4,8)	code, and form the ordered pairs	L L	→	(0,0)
I R	→	(8,6)	that represent your last name.	L J	→	(0,9)
				J O	→	(9,3)

Now create the design…

- Using graph paper given to you, plot all the ordered pairs in order, first name then last name. Connect the points with line segments as you go.

- Reflect all the points and segments across the x-axis.

- Translate all the points and segments over -12 units and 5 units.

- Rotate all (original) points and segments 180° clockwise.

- Color your design to reflect your personality using the Kente cloth symbolic meanings of the colors as your guide. Each time you transform the design keep the coloring exact.

- On the sides of the graph paper, write **ALL** the ordered pairs used in your design (see name example) by category. Categories: 1.) Pre-Image or Original Coordinates, 2.) Reflection Across X-Axis Coordinates, 3.) Translation, and 4.) 180° clockwise rotation

Grading Rubric

Project Requirements	Points Available	Points Earned
The name is coded correctly and the coded ordered pairs are written beside the design on the graph paper.	10	
Pre-image/original design is graphed correctly.	20	
Reflected image across x-axis graphed correctly and the new coordinates are written beside the image.	20	
Translated image of (-12,5) graphed correctly and the new coordinates are written beside the image.	20	
180° clockwise rotated image is graphed correctly and the new coordinates are written beside the image.	20	
Design is colored, creative and neat. Each time the transformation is completed the color pattern remains the same.	10	
Total	100	