

## Summer Assignment 2009 for 10<sup>th</sup> Geometry Students: Geometry in Art—Using Reflections & Translations

Geometry is the study of two-dimensional and three-dimensional figures. Architects, engineers, airplane pilots, and artists are a few people who use geometry in their profession. Your summer assignment is to learn about the geometry in Islamic art and to create your own pieces of art using geometric relationships.

### Part I: Background Information about Islamic Art

#### PROCEDURE

1. Do a little research about Islamic art. If you are going to use internet based research, use cites that are supported by a university, art museums, etc. Answer the following questions in coherent typed paragraphs (150-250 words). Use your own words and cite your sources.

**Questions:** What are the defining characteristics of Islamic art?  
What geometric relationships are used in Islamic art?  
How does Islamic art reflect core beliefs in Islam?

2. Look at a variety of Islamic art pieces using the internet, library resources, etc. Pick something that you find particularly interesting. Cut off "My Favorite Piece of Islamic Art" (see attached). Complete a sketch of the piece of art. State some particulars describing the piece of art (name of the piece, time period it was created, artist, country origin, etc.) and describe why this piece is particularly interesting to you.

### Part II: Creating Your Own Geometric Art

#### PROCEDURE

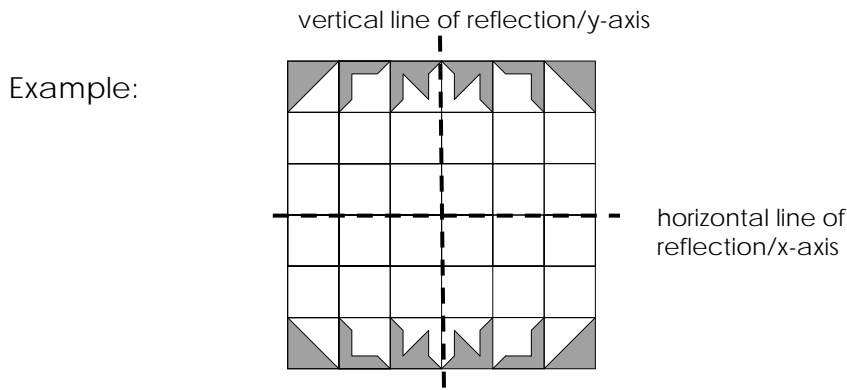
1. Use the provided 6 by 6 square grid (see attached). Divide the grid into four equal quadrants. The x-axis is the horizontal line of reflection and the y-axis is the vertical line of reflection.
2. Draw a separate design in each of the first three boxes in the **top** row. (Use your own unique design, not mine.) Use color.



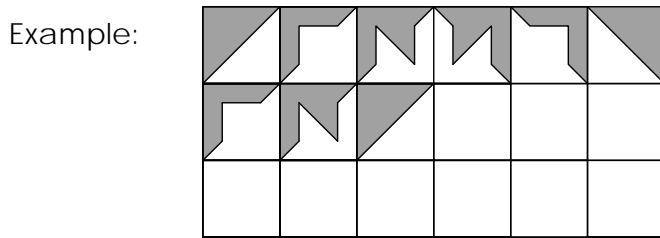
3. Reflect the designs in these boxes over the vertical line of reflection (y-axis).



4. Now reflect the design in the top row over the horizontal line of reflection (x-axis).

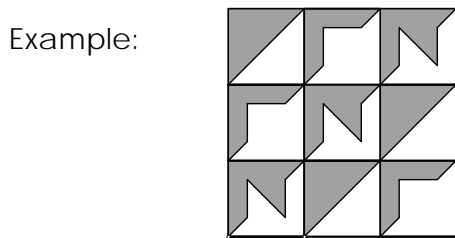


5. Complete the second row by changing the order of the designs in the first three boxes Design 1 goes to box 3, design 2 goes to box 1, and design 3 goes to box 2.

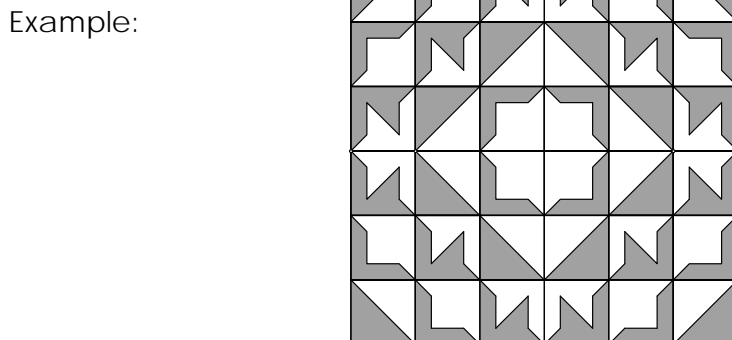


6. Repeat steps 3 and 4 by reflecting the designs in the second row over the vertical line of reflection and then the horizontal line of reflection.

7. Complete the third row by changing the order of the first three original boxes again. Original design 2 goes to box 3, original design 3 goes to box 1, and original design 1 goes to box 2.



8. Reflect the designs over the vertical line of reflection and then over the horizontal line of reflection.



Congratulations! You have made a piece art based on three designs that have been translated and reflected several times.

9. Now create a piece of art using the provided 8 by 8 square grid and following the procedures given above, except in this case you are translating four original boxes instead of three. (Notice that each box moves in a diagonal down and to left to create every row.) Make this 8 by 8 a true piece of art by choosing your four original designs carefully. Pick designs (or symbols) that have a special meaning to you.
10. Make a key that shows what each of the four original designs represents.

**Part III: Putting It All Together**

Trim the white paper border off of your personal pieces of geometric art. Mount the personal pieces, the key to your 8 by 8 grid, "My Favorite Piece...", and background information on a 1/2 sheet of standard-sized poster board. Include a title, and put your name on the back.

*Bring your project to class on the first day of school so you can share it with us. Feel free to drop it off in the morning if you do not want to carry it around all day. It will be graded by the rubric given below. (If it is late, five points will be deducted for every school day.)*

**Summer Assignment Check-list: Geometry in Art—Using Reflections & Translations**

Part I: Background Information about Islamic Art

- a. Paragraph (total of 16 points)
  - Coherent and addresses the questions (3 pts. per question) – 12 points \_\_\_\_\_
  - Format (typed and an appropriate length)- 2 points \_\_\_\_\_
  - Sources cited – 2 points \_\_\_\_\_
- b. "My Favorite Piece of Islamic Art" (total of 9 points)
  - Sketch – 4 points \_\_\_\_\_
  - Two questions answered – 4 points \_\_\_\_\_
  - Source – 1 point \_\_\_\_\_

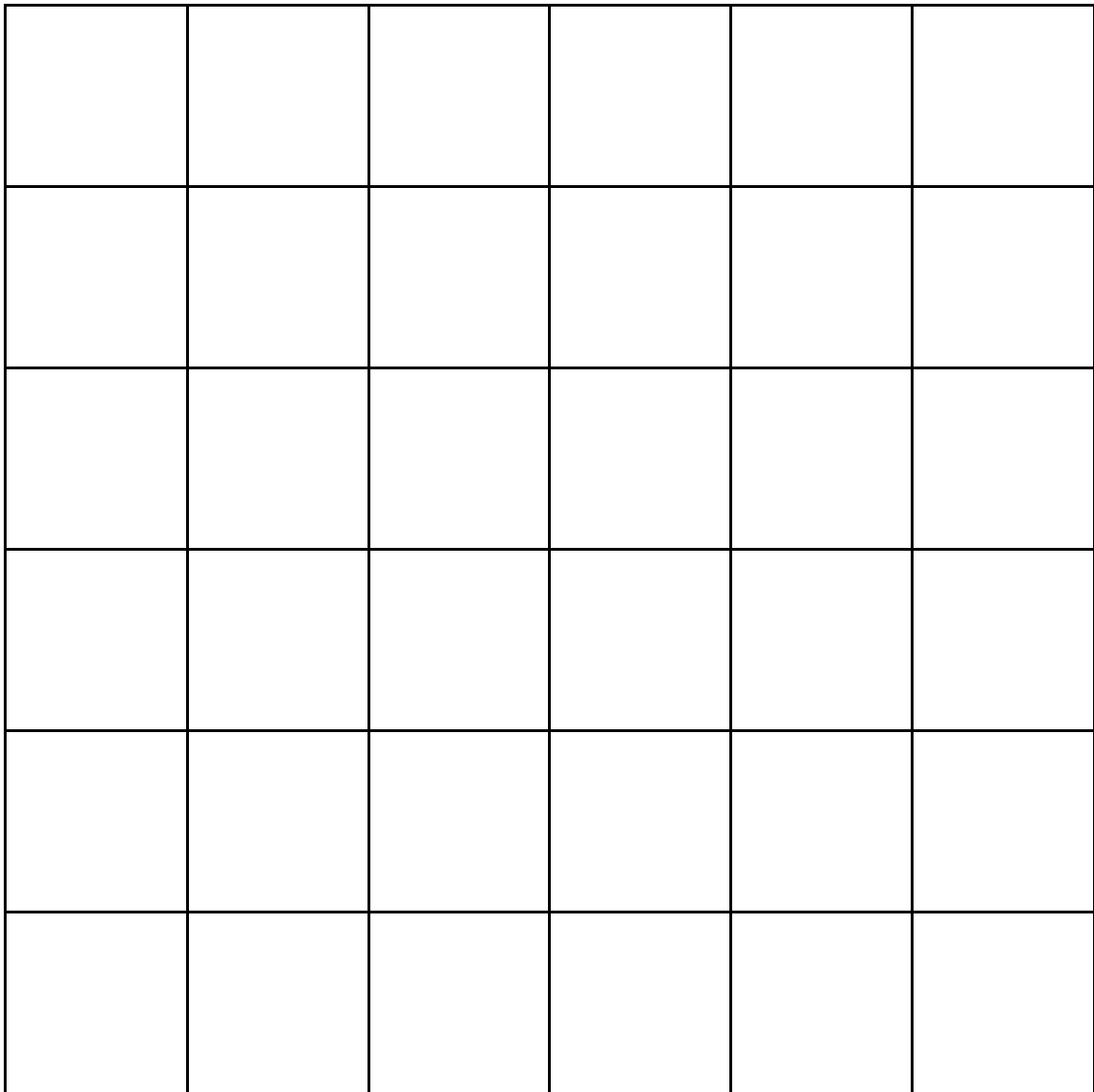
Part II: Creating Your Own Geometric Art

- a. 6 by 6 grid (total of 28 points)
  - 3 original designs are translated correctly – 6 points \_\_\_\_\_
  - Designs are reflected correctly across the x-axis – 9 points \_\_\_\_\_
  - Designs are reflected correctly across the y-axis – 9 points \_\_\_\_\_
  - Appearance is neat, creative, and colorful – 4 points \_\_\_\_\_
- b. 8 by 8 grid (total of 37 points)
  - 4 original designs are translated correctly – 9 points \_\_\_\_\_
  - Designs are reflected correctly across the x-axis – 10 points \_\_\_\_\_
  - Designs are reflected correctly across the y-axis – 10 points \_\_\_\_\_
  - Key is provided explaining 4 original designs – 4 points \_\_\_\_\_
  - Appearance is neat, creative, and colorful – 4 points \_\_\_\_\_

Part III: Putting It All Together

- a. Format (mounted, 1/2 poster board, titled)- 6 points \_\_\_\_\_
- b. Appearance (organized and neat) – 4 points \_\_\_\_\_

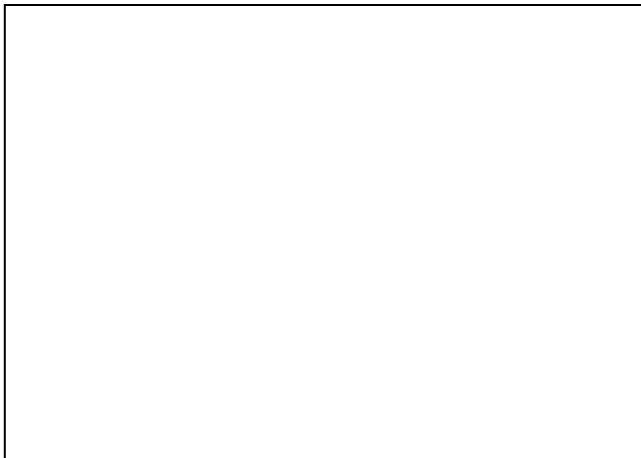
**TOTAL** \_\_\_\_\_



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**My Favorite Piece of Islamic Art**

**Sketch**



**What do you know about the piece?**

**Why did you pick this piece?**

source:

