

Exam

By Jack Schmidt

Name: _____
MA111-009
2011-04-18

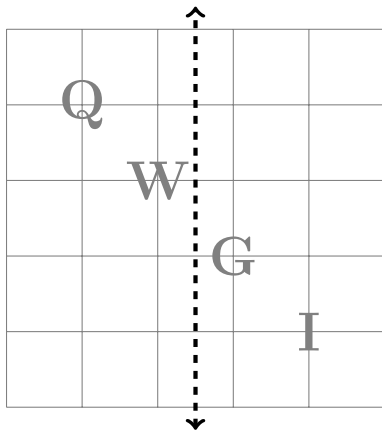
Part I: Vocabulary

Consider the capital letter E and the following rigid motions.
Match the rigid motion to the closest description of the result:

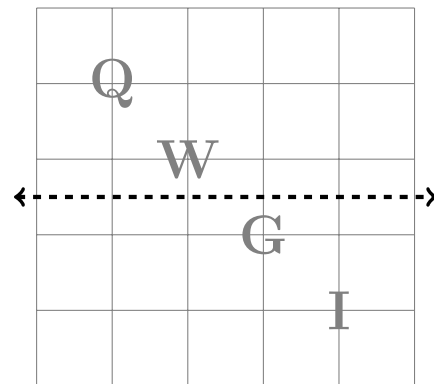
- | | |
|--|------------------|
| 1. Reflect over a vertical line. | (a) The letter M |
| 2. Reflect over a horizontal line. | (b) The number 3 |
| 3. Rotate 90 degrees clockwise. | (c) The letter W |
| 4. Rotate 90 degrees counterclockwise. | (d) The letter E |

Draw the results of the indicated rigid motions:

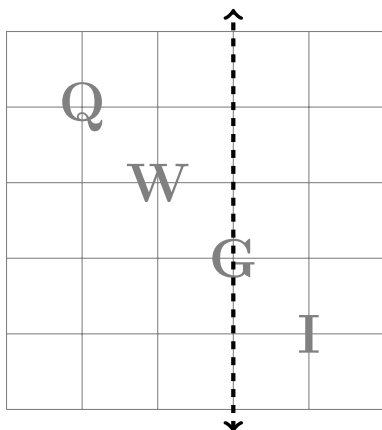
Reflect over the vertical line:



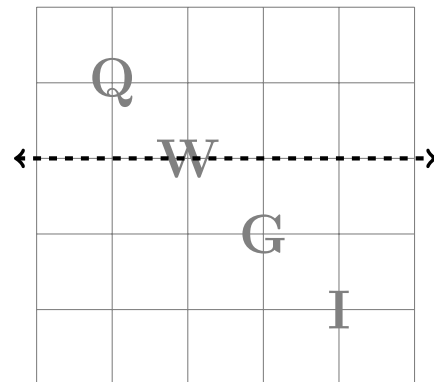
Reflect over the horizontal line:



Reflect over the vertical line:



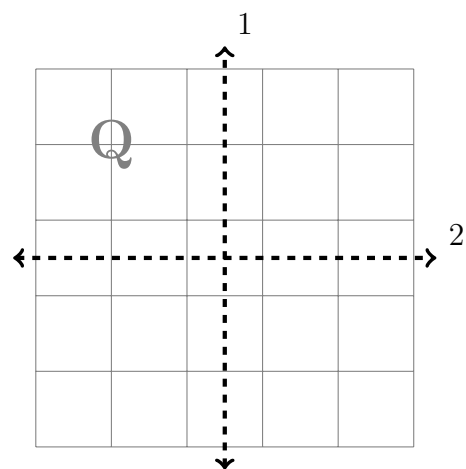
Reflect over the horizontal line:



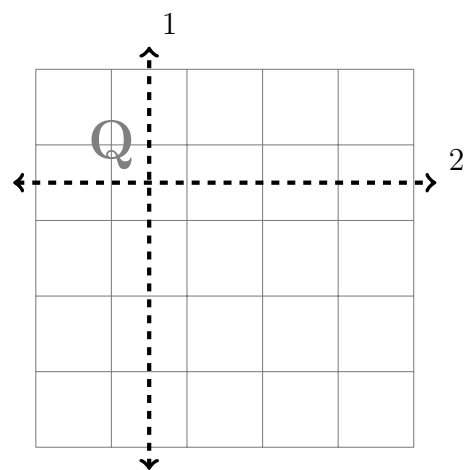
Part II: Composition

1. Apply the first rigid motion to the picture shown. Then apply the second rigid motion to the result of the first.

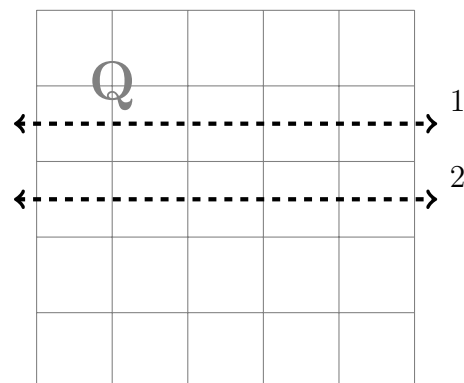
Reflect over the vertical line,
then reflect over the horizontal line.



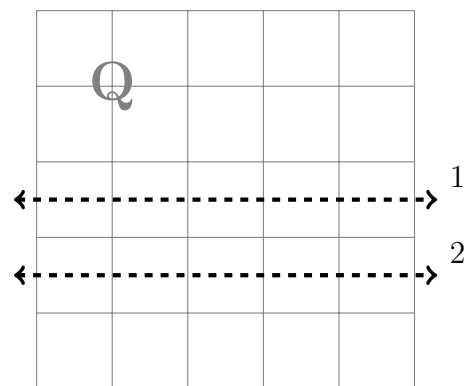
Reflect over the vertical line,
then reflect over the horizontal line.



Reflect over the top horizontal line,
then reflect over the lower horizontal line.



Reflect over the top horizontal line,
then reflect over the lower horizontal line.



2. Ignore the first reflected Q and only consider the original Q and the twice reflected Q. Describe in words what happens to the original Q to get it to the twice reflected Q.

(a)

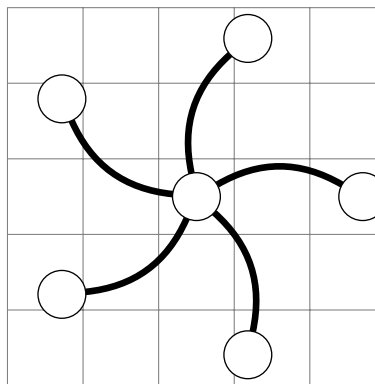
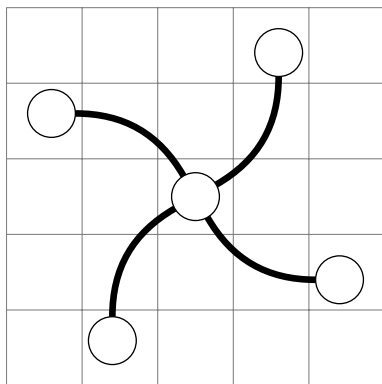
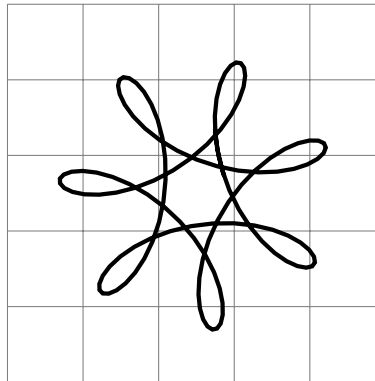
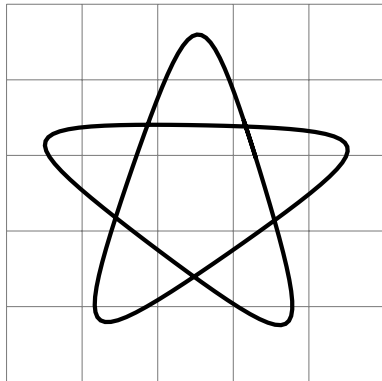
(b)

(c)

(d)

Part III: Symmetries of finite shapes

1. Draw the lines of reflectional symmetry and label the symmetry type of these 4 shapes.

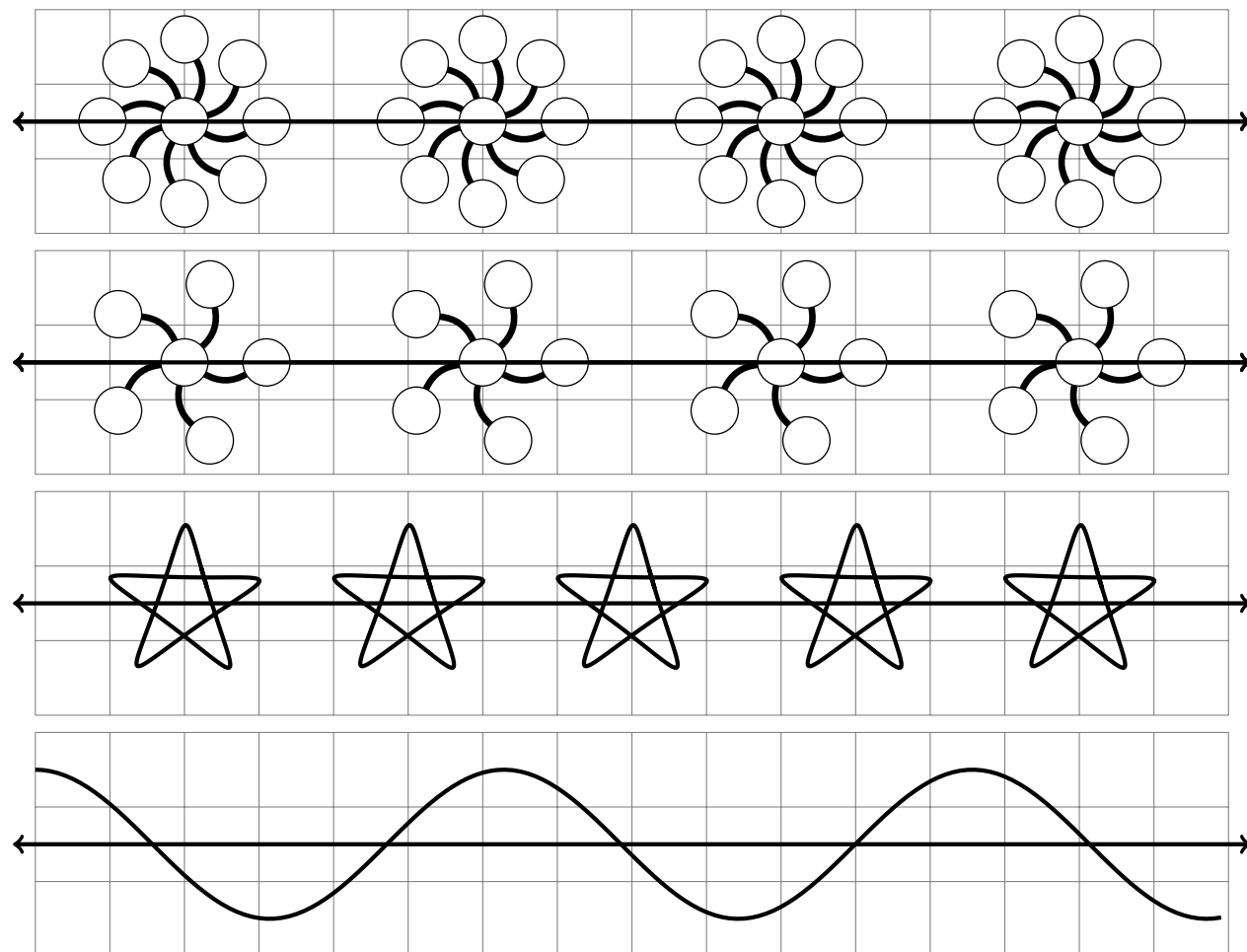


2. Draw a shape with Z_3 symmetry.

3. Draw a shape with D_3 symmetry.

Part IV: Symmetries of border patterns

1. Draw the lines of reflectional symmetry, centers of rotational symmetry, and label the symmetry type of these 4 border patterns.



2. Draw a border pattern with jump type symmetry.

3. Draw a border pattern with step type symmetry.