68. Suppose \( M \) is a translation by the vector \( v \) and \( N \) is a 90° clockwise rotation with rotocenter \( O \), as shown in the following figure.

(a) Find the image of triangle \( ABC \) under the product of \( M \) and \( N \).
(b) Explain why the product of \( M \) and \( N \) is a rotation, and find the rotocenter and angle of the rotation.

69. Suppose \( M \) is a 90° clockwise rotation with rotocenter \( O \), and \( N \) is a glide reflection with axis \( l \) and vector \( v \), as shown in the following figure.

(a) Find the image of the shaded figure under the product of \( M \) and \( N \).
(b) Explain why the product of \( M \) and \( N \) is a reflection, and find the axis of the reflection.

70. Using copies of the symbol \( \heartsuit \) (and rotated versions of it), construct border patterns of symmetry type
(a) \( mg \).
(b) \( m1 \).
(c) \( 1m \).
(d) \( 11 \).
(e) \( 12 \).
(f) \( 1g \).
(g) \( mm \).

71. A rigid motion \( M \) moves the triangle \( PQR \) into the triangle \( P'Q'R' \) as shown in the figure. Explain why the rigid motion \( M \) must be a glide reflection.

72. A palindrome is a word that is the same when read forward or backward. MOM is a palindrome and so is ANNA. (For simplicity, we will assume all letters are capitals.)
(a) Explain why if a word has vertical reflection symmetry, then it must be a palindrome.
(b) Give an example of a palindrome (other than ANNA) that doesn’t have vertical reflection symmetry.
(c) If a palindrome has vertical reflection symmetry, what can you say about the symmetries of the individual letters in the word?
(d) Find a palindrome with 180° rotational symmetry.

73. Let the six symmetries of the equilateral triangle \( ABC \) shown in the figure be denoted as follows: \( r_1 \): reflection with axis \( l_1 \), \( r_2 \): reflection with axis \( l_2 \), \( r_3 \): reflection with axis \( l_3 \), \( R_1 \): 120° clockwise rotation with rotocenter \( O \), \( R_2 \): 240° clockwise rotation with rotocenter \( O \), \( I \): the identity symmetry.

Complete the following table by entering, in each row and column of the table, the symmetry that results when applying first the symmetry in the row followed by the symmetry in the column. (For example, the entry in row \( r_1 \) column \( r_2 \) is \( R_1 \) because the reflection \( r_1 \) followed by the reflection \( r_2 \) equals the rotation \( R_1 \).)