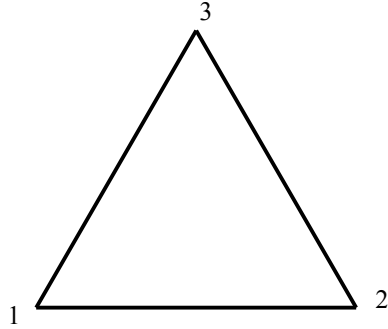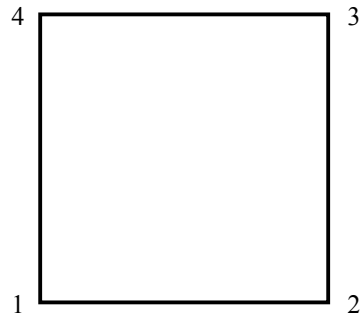# The Symmetry Groups
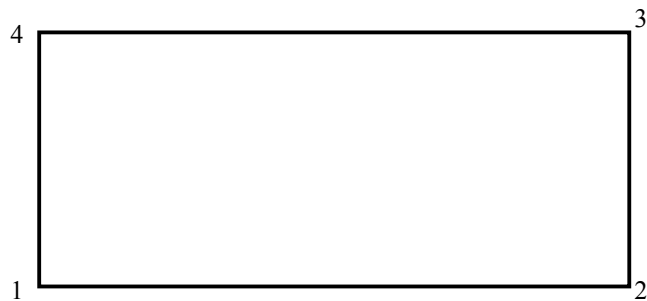
1. List all rigid motions (symmetries) of the triangle. Give each rigid motion an appropriate shorthand name, such as R_{120}.

                    3

        1   2

2. List all rigid motions (symmetries) of the square.

        4   3

        1   2

3. List all rigid motions (symmetries) of the rectangle.

                        3
        4

        1   2

4. a) A rotation followed by a rotation is always a _____.

   b) A flip followed by a flip is always a _____.

   c) A flip followed by itself is always _____.

   d) A flip followed by a rotation is always a _____.

   e) A rotation followed by a flip is always a _____.

5. List all rigid motions (symmetries) of the regular pentagon (5 sides).

6. List all rigid motions (symmetries) of the regular hexagon (6 sides).

7. Describe all rigid motions (symmetries) of the regular *n*-gon (*n* sides) for *n* odd.

8. Describe all rigid motions (symmetries) of the regular *n*-gon (*n* sides) for *n* even.

Adapted from *Laboratory Experiences in Group Theory,* Ellen Maycock Parker

3

1   2

3

1   2

4   3

1   2

4   3

1   2

4   3

1   2

4   3

1   2