Frieze Patterns

A frieze pattern is a pattern that repeats in one direction. The patterns depend on the use of transformations. Many cultures have used frieze patterns to make decorative designs on buildings, textiles, pottery, and so on.

One way of creating a frieze pattern is to make a basic design on a grid and then to transform the design. An example of a basic design is shown.

1. Describe how transformations have been used to create each of the following frieze patterns from the basic design.

a) 

b)
2. The frieze pattern shown was created from equilateral triangles of side length 2 units.

Suppose a coordinate grid is superimposed on the pattern, as shown.

a) What is the exact slope of line segment 1?

b) Write an equation for line segment 1.

3. Use transformations to write an equation for
   a) line segment 2    b) line segment 3    c) line segment 4

4. a) Design your own frieze pattern from a basic design of your choice.
   b) Describe how you used transformations to create the pattern.
   c) Suggest a possible use for your frieze pattern, and explain why you chose this use.

5. **Research** Use your research skills to determine how frieze patterns are classified and how many types of frieze patterns there are.