



# Beautiful Geometry

Fall in love with geometry by uncovering elegant solutions to beautiful geometric problems.

📺 35 Lessons

## 1

### Introduction

Start



Infinite Areas



Polyomino Tiling



Guards in the Gallery

## 2

### Tessellations and Reptiles



Regular Tessellations



Semiregular Tessellations



Transforming Tiles Part 1



Transforming Tiles Part 2



Irregular Tiles



Reptiles



Infinite Arithmetic

## 3

### Polyominoes



Tiling a Chessboard



Counting All Possible Solutions



Bigger Polyomino Blocks



Challenging Packing Puzzles



X-Only



Tiling and Cutting



Congruent Cutting

## 4

### Folding Puzzles



Mathematical Origami



Dragon Folding



1D Flat Folding



2D Holes and Cuts



2D Single-Vertex Flat Folding (I)



2D Single-Vertex Flat Folding (II)

## 5

### Guarding Galleries



Strange Polygons



Convex vs. Concave



Quadrilateral and Pentagonal Galleries



Efficient Guard Placement



Worst-Case Designs



Fisk's Coloring Proof



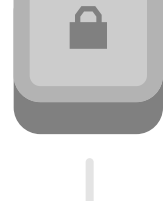
Further Art Gallery Research

## 6

### Pick's Theorem



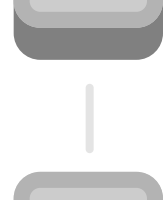
Pegboard Rectangles



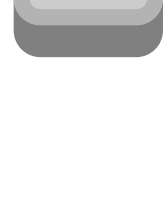
Pegboard Triangles



Pick's Theorem Generalized



Pick's Theorem With One Hole



Pick's Theorem With Multiple Holes

#### Course description

Are you ready to start loving geometry? This course is here to guide you through some of the magic of geometry, revealing the thought processes that lead to clever solutions to beautiful geometry problems.

By the end of this course, you'll have explored polyominoes, tessellations, origami folding, art gallery problems, and lattice polygons.

#### Topics covered

Convexity and  
Concavity  
Deconstructing  
Origami  
Fisk's Coloring Proof  
Fractals  
Lattice Polygons  
Packing Puzzles

Pick's Theorem  
Polyominoes  
Reptiles  
Tessellations  
The Art Gallery  
Problem  
Triangulation

#### Prerequisites

[Geometry Fundamentals](#)

#### Next steps

[Geometry II](#)