

# High School Geometry

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*2019: Last compiled 2019-06-17*



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## Preface

# Open tools for writing open interactive textbooks

A tutorial resource: R, RStudio, RMarkdown,  
Bookdown, Github, Shiny, [hypothes.is](https://hypothes.is), Zotero



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**Matthew J. C. Crump (2018)**

Taylor, Steven A. (2018). High School Geometry. <https://phsmath.github.io/OERGeometry/>

This is an Open Education Resource for High School Geometry that meets the requirements of Oregon's High School Math Standards.

This web-book is itself a work in progress. All of the source code needed to compile this book yourself is included in the github repository for this book. You can download the repository, replace this text with your own, and then compile your book as a web-page, .pdf or epub.

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## Chapter 1

# Reasoning and Proof

### 1.1 Axiomatic Development of Mathematics

#### 1.1.1 Undefined Terms

#### 1.1.2 Undefined Relations

#### 1.1.3 Axioms Relating the Undefined Terms and Undefined Relations

#### 1.1.4 Theorems

### 1.2 Logic and Propositional Calculus

#### 1.2.1 Propositions and Compound Propositions

### 1.3 Reasoning

#### 1.3.1 Inductive Reasoning

#### 1.3.2 Deductive Reasoning

### 1.4 Logical Operations

#### 1.4.1 Conditional Statements

#### 1.4.2 Basic Logical Operations

#### 1.4.3 Propositions and Truth Tables

#### 1.4.4 Tautologies and Contradictions

#### 1.4.5 Logical Equivalence

#### 1.4.6 Algebra of Propositions

#### 1.4.7 Conditional and Biconditional Statements

#### 1.4.8 Arguments

#### 1.4.9 Logical Implication

### 1.5 Sets and Basic Operations on Sets

## Chapter 2

# Essentials of Geometry

2.1 Points, Lines, and Planes

2.2 Segments and Congruence

2.3 Midpoint and Distance Formulas

2.4 Angles

2.5 Angle Pair Relationships

2.6 Polygons

2.7 Prove Statements About Segments and Angles

2.8 Prove Angle Pair Relationships



## Chapter 3

# Lines

3.1 Line and Angle Pairs

3.2 Parallel Lines and Transversals

3.3 Slopes of Lines

3.4 Write and Graph Equations of Lines

3.5 Perpendicular Lines

3.6 Intersection of Lines





## Chapter 4

# Congruent Triangles

### 4.1 Triangle Properties

#### 4.1.1 Classification

#### 4.1.2 Triangle Sum Theorem

#### 4.1.3 Exterior Angle Theorem

### 4.2 Apply Congruence in Triangles

#### 4.2.1 Definitions

#### 4.2.2 Third Angles Theorem

#### 4.2.3 Properties of Congruent Triangles

### 4.3 Transformations and Congruence

#### 4.3.1 Rigid Transformations

##### 4.3.1.1 Translation

##### 4.3.1.2 Reflections

##### 4.3.1.3 Rotations

#### 4.3.2 Non-Rigid Transformations

##### 4.3.2.1 Dilations

#### 4.3.3 Perform Congruence Transformations

##### 4.3.3.1 Coordinate Notation

##### 4.3.3.2 Matrix and Vector Notation

#### 4.3.4 Perform Non-Congruence Transformations

##### 4.3.4.1 Scalar Multipliation

### 4.4 Proving Triangles are Congruent

#### 4.4.1 Side-Side-Side Congruence Postulate

#### 4.4.2 Side-Angle-Side Congruence Postulate



## Chapter 5

# Relationships within Triangles



## Chapter 6

# Similarity



## Chapter 7

# Right Triangles and Trigonometry



## Chapter 8

# Quadrilaterals





## Chapter 9

# Transformations



## Chapter 10

# Circles



## Chapter 11

# Measurements



## Chapter 12

# Probability