

# **SYLLABUS OF GEOMETRY**

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Syllabus of Geometry by G. A. Wentworth

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**G. A. WENTWORTH**

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*Alexander Ziefel*

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OF

## GEOMETRY

BY

G. A. WENTWORTH, A.M.

AUTHOR OF A SERIES OF TEXT-BOOKS IN MATHEMATICS

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G. A. Wentworth

## PREFACE.

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THIS pamphlet contains the enunciations of the propositions and corollaries of the author's text-book in Geometry, numbered as they are in the text-book.

The Syllabus is not designed to take the place of the Geometry, but it can be used with great advantage in the recitation room, especially in connection with the author's pamphlet of Geometrical Exercises.

G. A. WENTWORTH.

EXETER, N. H.  
1896.

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## SYLLABUS.

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### MATHEMATICAL TERMS.

**66.** A *proof* or *demonstration* is a course of reasoning by which the truth or falsity of any statement is logically established.

**67.** A *theorem* is a statement to be proved.

**68.** A theorem consists of two parts: the hypothesis, or that which is assumed; and the conclusion, or that which is asserted to follow from the hypothesis.

**69.** An *axiom* is a statement the truth of which is admitted without proof.

**70.** A *construction* is a graphical representation of a geometrical figure.

**71.** A *problem* is a question to be solved.

**72.** The solution of a problem consists of four parts:

(1) The *analysis*, or course of thought by which the construction of the required figure is discovered;

(2) The *construction* of the figure with the aid of ruler and compasses;

(3) The *proof* that the figure satisfies all the given conditions;

(4) The *discussion* of the limitations, which often exist, within which the solution is possible.

**73.** A *postulate* is a construction admitted to be possible.

**74.** A *proposition* is a general term for either a theorem or a problem.



**75.** A *corollary* is a truth easily deduced from the proposition to which it is attached.

**76.** A *scholium* is a remark upon some particular feature of a proposition.

**77.** The *converse* of a theorem is formed by interchanging its hypothesis and conclusion. Thus,

If  $A$  is equal to  $B$ ,  $C$  is equal to  $D$ . (Direct.)

If  $C$  is equal to  $D$ ,  $A$  is equal to  $B$ . (Converse.)

**78.** The *opposite* of a proposition is formed by stating the negative of its hypothesis and its conclusion. Thus,

If  $A$  is equal to  $B$ ,  $C$  is equal to  $D$ . (Direct.)

If  $A$  is not equal to  $B$ ,  $C$  is not equal to  $D$ . (Opposite.)

**79.** The converse of a truth is not *necessarily* true. Thus, every horse is a quadruped is a true proposition, but the converse, Every quadruped is a horse, is not true.

**80.** If a direct proposition and its converse are true, the opposite proposition is true; and if a direct proposition and its opposite are true, the converse proposition is true.

**81.**

## POSTULATES.

Let it be granted —

1. That a straight line can be drawn from any one point to any other point.

2. That a straight line can be produced to any distance, or can be terminated at any point.

3. That a circumference may be described about any point as a centre with a radius of given length.

**82.**

## AXIOMS.

1. Things which are equal to the same thing are equal to each other.

2. If equals are added to equals the sums are equal.

3. If equals are taken from equals the remainders are equal.

4. If equals are added to unequals the sums are unequal, and the greater sum is obtained from the greater magnitude.

5. If equals are taken from unequals the remainders are unequal, and the greater remainder is obtained from the greater magnitude.

6. Things which are double the same thing, or equal things, are equal to each other.

7. Things which are halves of the same thing, or of equal things, are equal to each other.

8. The whole is greater than any of its parts.

9. The whole is equal to all its parts taken together.

### 83. SYMBOLS AND ABBREVIATIONS.

+	increased by.	Def. . . . .	definition.
-	diminished by.	Ax. . . . .	axiom.
×	multiplied by.	Hyp. . . . .	hypothesis.
÷	divided by.	Cor. . . . .	corollary.
=	is (or are) equal to.	Adj. . . . .	adjacent.
≅	is (or are) equivalent to.	Iden. . . . .	identical.
>	is (or are) greater than.	Cons. . . . .	construction.
<	is (or are) less than.	Sup. . . . .	supplementary.
∴	therefore.	Sup.-adj.	supplementary-adjacent.
∠	angle	Ext.-int.	exterior-interior.
∠	angles.	Alt.-int.	alternate-interior.
⊥	perpendicular.	Ex. . . . .	exercise.
⊥	perpendiculars.	rt. . . . .	right.
∥	parallel.	st. . . . .	straight.
∥	parallels.	Q. E. D. . . . .	quod erat demonstrandum, <i>which was to be proved.</i>
△	triangle.	Q. E. F. . . . .	quod erat faciendum, <i>which was to be done.</i>
▲	triangles.		
▭	parallelogram.		
▭	parallelograms.		
○	circle.		
⊙	circles.		

## BOOK I.

### THEOREMS.

**84.** All straight angles are equal.

**85. Cor. 1.** All right angles are equal.

**86. Cor. 2.** The angular units, degree, minute, and second, have constant values.

**87. Cor. 3.** The complements of equal angles are equal.

**88. Cor. 4.** The supplements of equal angles are equal.

**89. Cor. 5.** At a given point in a given straight line one perpendicular, and only one, can be erected.

**90.** If two adjacent angles have their exterior sides in a straight line, these angles are supplements of each other.

**92. Cor.** Since the angular magnitude about a point is neither increased nor diminished by the number of lines which radiate from the point, it follows that,

The sum of all the angles about a point in a plane is equal to two straight angles, or four right angles;

The sum of all the angles about a point on the same side of a straight line passing through the point is equal to a straight angle, or two right angles.

**93.** If two adjacent angles are supplements of each other, their exterior sides lie in the same straight line.

**94.** Since Theorems 90 and 93 are true, their opposites are true (§ 80); namely :

If the exterior sides of two adjacent angles are not in a straight line, these angles are not supplements of each other.

If two adjacent angles are not supplements of each other, their exterior sides are not in the same straight line.