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*University of the State of New York*

# Examinations Department

### 116th examination

## PLANE GEOMETRY

**Wednesday**, September 27, 1893—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

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*Answer any 10 questions but* **no more.** *If more than 10 questions are answered, only the first 10 of these answers will be considered. Each complete answer will receive 10 credits.*

1 Define *right angle, rhomboid, plane figure, sector, similar polygons.*

2 Prove that if two triangles have two sides and the included angle of one respectively equal to two sides and the included angle of the other, the two triangles are equal in all their parts.

3 Prove that a line parallel to the base of a triangle divides the other sides proportionally.

4 The base of a triangle is 16 ft and the other sides are 8 ft and 12 ft. A line parallel to the base cuts off 2 ft from the lower end of the shorter side. Find the segments of the other side and the length of the parallel.

5 Two chords intersect in a circle; the segments of the first are 8 ft and 6 ft; the longer segment of the second is 12 ft. Find the length of the second chord.

6 Prove that an inscribed angle is measured by one half the arc included between its sides.

7 Two secants intersect without a circle. The arcs included between them are 60° and 20° respectively. The segments of the first are 4 ft and 20 ft; the external segment of the second is 16 ft. Find the angle between them and length of second.

8 Prove that the bisectors of the three angles of a triangle meet at the same point.

9 A segment whose arc is 60° is cut off from a circle whose radius is 15 ft. Find the area of the segment.

10 Describe a circumference passing through two given points and having a given radius. (Give proof.)

11 In a right angled triangle, the perpendicular let fall from the vertex of the right angle to the opposite side divides that side into two segments which are $4\frac{2}{7}$ ft and $5\frac{5}{7}$ ft. Find the three sides of the triangle.

12 Construct a square equal to the sum of two given squares. (Give proof.)

13 Construct a common tangent to two given circles. (Give proof.)

14 Construct a triangle equal to a given polygon.

15 Derive an algebraic formula for the area of an equilateral triangle in terms of the radius of the circumscribed circle.