University of the State of New York

Examination Department

141ST EXAMINATION

PLANE GEOMETRY

Wednesday, September 23, 1896—9:15 a. m. to 12:15 p. m., only

100 *credits, necessary to pass,* 75

Answer the first five questions and five of the others but **no more.** *If more than five of these other questions are answered only the first five of these answers will be considered. Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically. Each complete answer will receive 10 credits.*

1 Define *proposition, axiom, hypothesis, pentagon, regular polygon.*

2–3 Prove that any two rectangles are to each other as the products of their bases and altitudes.

4–5 Prove that two triangles which are mutually equiangular are similar.

6 Show that the square constructed on the diagonal of a given square is double the given square.

7 Show how to construct a tangent to a circle from a point outside the circle.

8 In a certain circle a chord 10 ft long intersects another chord so that the segments of the second chord are 8 ft and 3 ft; find the segments of the first chord.

9 Show how to construct a square whose area shall be one half that of a given square.

10 Given two lines a and b, to construct a third line x so that $x = \sqrt{ab}$

11 In a circle whose radius is 8 ft find the area of a segment whose arc is 60°.

12 From a point outside a circle a tangent and a secant are drawn; the distance from the given point to the first point of intersection of the secant is 8 ft and to the second point is 18 ft; find the length of the tangent.

13 Show how to construct a triangle having given two sides and the angle opposite one of them.

14 Write the formula for (*a*) the area of a circle in terms of its radius, (*b*) the area of a circle in terms of its diameter, (*c*) the area of a circle in terms of its radius and circumference, (*d*) the area of a regular triangle in terms of its side, (*e*) the area of a regular hexagon in terms of its side.

15 Show how to obtain the hight of a vertical flagpole standing on a level plain without ascending this flagpole.