University of the State of New York

199TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, September 14, 1909 — 9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting two from each group. Write answers in the order of numbering. Each complete answer will receive 12½ credits. Papers entitled to less than 75 credits will not be accepted.

Group I 1 Define straight line, rhomboid, semicircle, secant, variable.

2 Prove that two triangles are equal if three sides of one are equal respectively to three sides of the other.

3 Prove that the line which joins the midpoints of two sides of a triangle is parallel to the third side and equal to half the third side.

Group II 4 Prove that an angle formed by two chords intersecting within a circumference is measured by half the sum of the intercepted arcs.

5 Prove that the perimeters of two similar polygons have the same ratio as any two homologous sides.

6 Construct a square equivalent to the sum of two given squares. Demonstrate.

Group III 7 Two parallel chords are 6 inches apart; the length of the smaller chord is 14 inches, the length of the greater is 32 inches. Find the distance of the smaller chord from the center of the circle.

8 Show how to construct an isosceles triangle with given altitude equivalent to a given square.

9 The diameter of a circle is 6 inches; show how to inscribe within the circle a regular hexagon and give proof. Find the area of the hexagon.

Group IV 10 Show how to draw a circle tangent to a given circle at a given point and passing through another given point outside the given circle.

11 Two equilateral triangles have a side of one equal to the altitude of the other; find the ratio of the areas of these triangles. Give proof.

12 In a certain regular polygon the sum of the interior angles is four times the sum of the exterior angles; find the number of sides of the polygon and give its name.