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University of the State of New York

Examination Department

118th examination

PLANE GEOMETRY

Wednesday, January 24, 1894 — 9 : 15 a. m. to 12 : 15 p. m., only

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100 *credits, necessary to pass,* 75

Answer any 10 questions but no more. *If more than 10 questions are answered only the first 10 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 *oblique triangles, similar polygons, equivalent figures.*

2–3 Prove that every point in the perpendicular erected at the middle of a given straight line is equally distant from the extremities of the line and every point not in the perpendicular is unequally distant from the extremities of the line.

4 The distance between two parallels is a and the distance between two points A and B in one parallel is $2b$. Find the radius of the circumference which passes through A and B, and is tangent to the other parallel.

5–7 Prove that two triangles are equal if a side and two adjacent angles of the one are equal respectively to a side and two adjacent angles of the other.

Tangents are drawn through a point 6 inches from the circumference of a circle whose radius is 9 inches. Find the length of the tangents and also the length of the chord joining the points of contact.

8 Prove that if three or more parallels intercept equal lengths on any transversal they intercept equal lengths on every transversal.

9 If the side of one equilateral triangle is equal to the altitude of another, what is the ratio of their areas?

10–12 Prove that a circle may be circumscribed about a regular polygon and that a circle may be inscribed within it.

If the perimeter of each of the figures, equilateral triangle, square and circle, is 396 feet, what is the area of each figure?

13 Given 13 inches and 15 inches, the length of two sides of a triangle, and 12 inches the altitude on the third side. Find the third side and also the area of the triangle. (Give one solution only.)

14 Prove that the bisector of an angle of a triangle divides the opposite side into segments proportional to the other two sides.

15 Describe the method of circumscribing a circle about a triangle. Give proof.