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University of the State of New York

Examination Department

122d examination

PLANE GEOMETRY

Wednesday, June 13, 1894 — 9 : 15 a. m. to 12 : 15 p. m., only

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100 *credits, necessary to pass,* 75

Answer 10 *questions but* **no more.** *Division of groups is not allowed. 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 and illustrate *tangent, sector, rhombus, plane angle.*

2 Prove that if two triangles have two angles and the included side of the one equal to two angles and the included side of the other, each to each, the triangles are equal in all their parts.

3 Prove that two triangles are similar if they have an angle in each equal and the including sides proportional.

4 Prove that in the same or equal circles central angles are in the same proportion as the arcs which their sides intercept.

5 Prove that the area of a trapezoid is equal to half the sum of its parallel sides multiplied by its altitude.

6 Prove that the square on the hypotenuse of a right triangle is equal to the sum of the squares on the other sides.

7–8 Construct an isosceles triangle, having given the angle between the equal sides and the radius of the inscribed circle.

9 Construct a tangent to a given circle, parallel to a given line.

10–11 Construct a triangle similar to a given triangle but double its area.

12 A triangle is divided into two equal parts by a line parallel to its base; find the ratio of the segments into which each of the other sides is divided.

13 The equal sides of an isosceles triangle are each 20 feet and the base is 22 feet; find the radius of the inscribed circle.

14 In a circle whose radius is 12 feet find the area of a segment whose arc is 90 degrees.

15 The chord of a circle divides the diameter through its middle point into segments of 16 feet and 4 feet respectively. Find the length of the chord.