University of the State of New York

Examinations Department

107th examination

PLANE GEOMETRY

Wednesday, January 25, 1893 — 9 : 15 a. m. to 12 : 15 p. m., only

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100 *credits, necessary to pass,* 75

NOTE — Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically.

1 Define and illustrate *alternate exterior angles, perimeter, rhomboid, inverse or reciprocal ratio.* 16

2 Distinguish between (*a*) equiangular and mutually equiangular polygons; (*b*) external and internal contact of two circles. 8

3 What polygon has the sum of its interior angles equal to twice the sum of the interior angles of a hexagon? Explain. 6

4 Prove that if two sides of a quadrilateral are equal and parallel the figure is a parallelogram. 10

5 Prove that in equal circles two angles at the center have the same ratio as their intercepted arcs. (Two cases.) 14

6 Prove that the area of a parallelogram equals the product of its base and altitude. 10

7 Make the following constructions and prove the correctness of each:

a To bisect a given angle; 8

b To inscribe a regular hexagon in a given circle. 8

8 Tangents are drawn from a point 10 inches from the center of a circle whose radius is 6 inches; find the length of each tangent and of the chord joining the points of tangency. 10

9 The areas of two circles are to each other as a^2 and b^2 and the difference of their radii is c; find the radius of each circle. 10