University of the State of New York

Examinations Department

105th examination

PLANE GEOMETRY

Wednesday, November 23, 1892—9 : 15 a. m. to 12 . 15 p. m., only

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48 *credits, necessary to pass,* 36

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

1 Define and illustrate (*a*) adjacent angles; (*b*) altitude of a triangle; (*c*) inscribed circle; (*d*) convex polygon. 8

2 Find (*a*) the complement of the supplement of 100°; (*b*) the supplement of the complement of 40°. Explain in each case. 4

3 If A and B represent the angles adjacent to one base of a trapezoid, what would be the values of each of its other two angles? Explain. 2

4 Prove that if from the same point to the same straight line a perpendicular and two oblique lines be drawn, the oblique line meeting the given line at the greater distance from the foot of the perpendicular will be the longer. 6

5 Prove that in the same circle or in equal circles angles at the center are in the same ratio as their intercepted arcs. (Two cases.) 8

6 Prove that if from a point without a circle a tangent and a secant be drawn, the tangent is a mean proportional between the whole secant and the external segment. 5

7 Solve the following and prove the correctness of each construction:

(*a*) to circumscribe a regular hexagon about a given circle; 6

(*b*) to construct a square equivalent to a given parallelogram. 5

8 Let r and r' represent the radii of two circles; find expressions for the difference (*a*) of their circumferences; (*b*) of their areas. 4