University of the State of New York

Examinations Department

104th examination

PLANE GEOMETRY

Wednesday, September 28, 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*) alternate interior angles, (*b*) obtuse triangle, (*c*) rhomboid, (*d*) regular polygon. 8

2 The difference of two inscribed angles is 15°; what is the difference of the corresponding angles at the center? Explain. 3

3 Find the area of a regular hexagon inscribed in a circle whose radius is 4 feet. (Obtain result correct to two places of decimals.) 3

4 Prove that if two angles of a triangle are unequal, the sides opposite are unequal and the greater side is opposite the greater angle. 5

5 Prove that an angle formed by a tangent and a secant intersecting without a circle is measured by one half the difference of the intercepted arcs. 6

6 Prove that the area of a parallelogram equals the product of its base and altitude. 5

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

(*a*) To construct a triangle, given one side and two angles. When is this problem impossible? 6

(*b*) To circumscribe a circle about a given triangle. 6

8 The perimeter of an isosceles triangle is 160 feet; the base is to one of the equal sides as 6 to 5; find the area of the triangle. 6