University of the State of New York

Examinations Department

111th examination

SOLID GEOMETRY

Friday, June 16, 1893—1 : 15 to 4 : 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 *the plane angle of a diedral angle, tangent plane, surface of revolution, oblique prism, sphere.* 15

2 Prove that if a straight line is perpendicular to each of two straight lines at their point of intersection, it is perpendicular to the plane of the two lines. 18

3 Prove that the sum of the face angles of any convex polyedral angle is less than four right angles. 14

4 Prove that the area of the surface of a sphere is equivalent to the area of four great circles of the sphere. 12

5 A side of the lower base of the frustum of a square pyramid is six feet, a side of the upper base four feet and the altitude of the frustum nine feet; find its volume. 8

6 A cone is divided into two equal parts by a plane parallel to the base; in what proportion is the altitude of the cone divided? 12

7 Write the algebraic formula for the volume of a cone; for the volume of a cylinder; for the volume of a sphere. 9

8 If the velocity of flow from a pipe two inches in diameter is 20 feet a second, how many hours will be required to fill a cistern six feet long, four feet wide and three feet deep? 12