## New York State Education Department

## 204TH HIGH SCHOOL EXAMINATION

## SOLID GEOMETRY

Monday, June 12, 1911 - 9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in solid geometry. Or four recitations a week for half a school year.

Answer eight questions, selecting four from each group.

- Group I 1 Prove that if two planes are perpendicular to each other, a straight line drawn in one of them perpendicular to their line of intersection is perpendicular to the other plane.
- 2 Prove that the sum of the face angles of any convex polyedral angle is less than four right angles.
- 3 Complete and demonstrate the following: Any two rectangular parallelepipeds are to each other as . . .
- 4 Prove that the volume of any pyramid is equal to one third the product of its base by its altitude.
- 5 Prove that the sum of the angles of a spheric triangle is greater than 180° and less than 540°.
- 6 Prove that the area of the surface of a sphere is equal to the product of the diameter of the sphere by the circumference of a great circle.
- Group II 7 Define five of the following: diedral angle, projection of a line on a plane, symmetric triedral angles, prism, right cylinder, sphere.
- 8 The volume of a sphere is 2929 π cubic inches; find its surface.
- 9 Find the ratio of the volumes of two similar tetraedrons whose homologous edges are as 1:8. Find the ratio of their homologous edges if their volumes are as 1:8.
- 10 The volume of a regular square pyramid is 18 cubic feet; its altitude is twice one side of the base. Find (a) the total surface of the pyramid, (δ) the area of a section made by a plane parallel to the base and one foot from the base.
- 11 If each of two intersecting planes is parallel to a given line their intersection is parallel to the given line.
- 12 Find the locus of a point on a sphere that is equidistant from two given points on the surface.