197TH HIGH SCHOOL EXAMINATION

SOLID GEOMETRY

Monday, January 25, 1909—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group.

Group I 1 State *four* ways in which a plane is determined and prove *one* of them.

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

3 Prove that the bases of a cylinder are equal.

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

Group II 5 Prove that the volume of a triangular pyramid equals one third the product of its base and altitude.

6 Find the weight of 52,800 linear feet of copper wire $\frac{1}{16}$ of an inch in diameter. [1 cu. ft of copper weighs 556 lb.]

7 Find the number of cubic feet of earth in a railway embankment 2500 feet long, 10 feet high, 12 feet wide at the top and 42 feet wide at the bottom.

8 Find the cost, at $2.50 a square foot, of gilding a hemispheric dome whose diameter is 50 feet.

Group III 9 A sphere of lead 10 inches in diameter is melted and cast into a cone 10 inches high; find the diameter of the base of the cone.

10 Find the capacity in cubic inches of a berry box in the form of the frustum of a pyramid 5 inches square at the top, $4\frac{1}{4}$ inches square at the bottom and $2\frac{3}{4}$ inches deep.

11 Two tanks are in form similar solids; one holds 128 gallons, the other 250 gallons. If the first is 20 inches deep find the depth of the second.

12 The total surface of a cube is 450 square inches; find its volume.