

## SOLID GEOMETRY

Monday, June 14, 1909—9.15 a. m. to 12.15 p. m., only

---

*Answer seven questions, selecting three from group I and two from each of the other two groups. Each complete answer will receive 14½ credits.*

**Group I** 1 Prove that if two angles, not in the same plane, have their sides respectively parallel and lying on the same side of the straight line joining their vertices, they are equal.

2 Prove that the volume of a triangular prism is equal to the product of its base by its altitude.

3 Prove that the volumes of two triangular pyramids, having a triedral angle of one equal to a triedral angle of the other, are to each other as the product of the three edges of these triedral angles.

4 State and prove the proposition relating to the area of a spheric polygon.

---

NOTE—Use  $\pi$  instead of its numeric value.

**Group II** 5 An isosceles trapezoid with bases 4 and 7 and altitude 4, is revolved on its longer base as an axis. Find the volume of the solid generated.

6 A cone 5 feet high is cut by a plane parallel to the base and 2 feet from the base; the volume of the frustum thus formed is 294 cubic feet. Find (a) the volume of the cone, (b) the volume of the part cut off by the plane.

7 A cylindric tank 10 feet long and 5 feet in diameter, lying with its axis horizontal, contains gasolene to the depth of 15 inches at the middle of the cross section. How much gasolene is there in the tank?

---

**Group III** 8 Find all possible locations of a point that is equidistant from two given points in space and at a given distance from a third point.

9 Prove that the exterior angle of a spheric triangle is less than the sum of the two opposite interior angles.

10 Prove that the area of a zone of one base is equal to the area of a circle whose radius is the chord of the generating arc of the zone.