

University of the State of New York
Examinations Department

81st examination

SOLID GEOMETRY

Friday, June 17, 1892—1:15 to 4:15 p. m., only

40 credits, necessary to pass, 30

NOTE.—Draw carefully and neatly each figure in construction or proof, using letters instead of numbers. Arrange work logically.

1. Define and illustrate (*a*) diedral angle; (*b*) regular prism; (*c*) frustum of a pyramid; (*d*) right section of a cylinder; (*e*) circular cone; (*f*) small circle of a sphere. 12
2. Name the regular polyedrons. Why can no others be formed? 4
3. Prove that if two angles not in the same plane have their sides respectively parallel, their planes are parallel. 4
4. Prove that the lateral surface of a regular pyramid is equal to half the product of the perimeter of the base by the slant height. 3
5. Prove that a plane perpendicular to a radius of a sphere at its extremity is tangent to the sphere. 3
6. The volumes of two similar cones are 54 cu. ft. and 432 cu. ft. respectively. If the altitude of the first is 6 ft., what is the altitude of the second? 3
7. Find the lateral surface and the volume of a regular hexagonal prism whose altitude is h and each side of whose base is $2a$. 5
8. The diameter of the upper base of a frustum of a cone is $2a$, of the lower base $2b$, and the altitude is h ; find the volume and the convex surface. 6