

University of the State of New York

## Examinations Department

81st examination

### PLANE GEOMETRY

Wednesday, June 15, 1892—9 : 15 a. m. to 12 : 15 p. m., only

48 credits, necessary to pass, 36

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

1. Define and illustrate (*a*) sector ; (*b*) segment ; (*c*) equimultiples of two quantities ; (*d*) the altitude of a triangle ; (*e*) the center of a regular polygon. 10
2. Find the number of degrees in an angle inscribed in the segment of a circle whose arc is  $240^\circ$ . Explain fully. 4
3. Prove that a radius perpendicular to a chord bisects the chord and the arc which it subtends. 5
4. Prove that the square described on the hypotenuse of a right triangle is equal to the sum of the squares described on the other two sides. 7
5. Prove that the areas of similar triangles are to each other as the squares of their homologous sides. 4
6. Prove that if two lines intersect, the opposite or vertical angles will be equal. 3
7. Make the following constructions and prove the correctness of each :
  - (*a*) To draw a line through a given point parallel to a given line. 4
  - (*b*) To construct a triangle when its three sides are given. When is the construction impossible? 3
8. Find the area of a field in the form of a trapezoid whose bases are 45 rods and 27 rods, and each of whose other sides is 15 rods. 4
9. Find :
  - (*a*) The area of a circle whose circumference is 60 feet. 2
  - (*b*) The area of an equilateral triangle whose perimeter is 60 feet. 2