University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES 18

PLANE GEOMETRY

Tuesday, September 16, 1913—9.15 a. m. to 12.15 p. m., only

Answer four questions from group I and three from group II. Papers entitled to less than 75 credits will not be accepted.

Group I

1 Prove that two triangles are equal if three sides of one are equal respectively to three sides of the other.

2 Prove that the diameter perpendicular to a chord bisects the chord and the arcs which the chord subtends.

3 Prove that the bisector of an angle of a triangle divides the opposite side into segments proportional to the adjacent sides.

4 Prove that the square described on the hypotenuse of a right triangle is equivalent to the sum of the squares described on the other two sides.

5 Prove that an equilateral polygon inscribed in a circle is a regular polygon.

6 Draw a triangle; construct another triangle, similar to the given triangle, one of whose sides has the ratio of 3:5 to an homologous side of the given triangle.

Group II

7 From a circle of a radius of 14″ is cut a sector whose central angle is 105°; find the perimeter of the sector.

8 Tangents are drawn through a point 6 inches from the circumference of a circle whose radius is 9 inches; find the length of the chord joining the points of contact.

9 Prove that in the same circle or in equal circles two inscribed triangles are equal if two sides of one are equal respectively to two sides of the other.

10 Prove that two chords, each perpendicular to the same chord at its extremities, are equal.

11 Prove that the angle at the center of a regular polygon is the supplement of the angle of the polygon.