The University of the State of New York

224TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Wednesday, January 19, 1921—9.15 a. m. to 12.15 p. m., only

Answer eight questions, including at least one from group II.

Group I

1 Prove that if two chords intersect within a circle, the product of the segments of one is equal to the product of the segments of the other.

2 If in a right triangle a perpendicular is drawn from the vertex of the right angle to the hypotenuse . . . State *three* conclusions that follow and prove *one* of them.

3 Prove that two right triangles are congruent if the hypotenuse and a leg of one are equal respectively to the hypotenuse and a leg of the other.

4 Prove that two parallel chords intercept equal arcs on a circle.

Group II

Answer at least one question from this group.

Leave all construction lines on the paper.

5 Inscribe a circle in a given triangle.

6 Construct a triangle, given two sides and the median to one of these sides.

7 Construct a circle whose area shall be equal to the sum of the areas of two given circles.

Group III

Leave all irrational results in the form of π and radicals unless otherwise stated.

8 How many sides has an equiangular polygon (a) if one of its interior angles equals $\frac{3}{4}$ of a straight angle, (b) if one of its exterior angles equals 72°?

9 The sides of a triangle are 9, 18 and 21. Compute (a) the area of the triangle, (b) the segments of side 21 made by the bisector of the opposite angle.

10 The radius of a circle is 12 units. Find the area and the perimeter of a segment in this circle whose chord equals the radius.

11 Prove that if a perpendicular is erected at any point in the base of an isosceles triangle, meeting one leg and the other leg produced, another isosceles triangle is formed external to the given triangle.

12 In a circle two chords AB and CD intersect at E, C being the mid point of minor arc AB. Draw AC and prove that $\overline{AC}^2 = CE \times CD$.