New York State Education Department

206TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, January 16, 1912 — 9.15 a.m. to 12.15 p.m., only

Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in plane geometry. The minimum time requirement is five recitations a week for a school year. Answer eight questions, selecting two from each group.

Group I

1 State (a) three theorems for proving that two scalene triangles are equal in all respects, (b) two theorems for proving that two right triangles are equal in all respects.

2 Complete and demonstrate the following: An angle formed by a secant and a tangent meeting in an external point is measured by . . .

3 Prove that the area of a parallelogram is equal to the product of its base by its altitude.

Group II

4 Prove that if two sides of a quadrilateral are equal and parallel, the figure is a parallelogram.

5 If $a$, $b$ and $c$ represent three straight lines, construct a line $x$ so that $x = \frac{ac}{b}$. Give proof.

6 Prove that two mutually equiangular triangles are similar.

Group III

7 The radius of a circle is 8 feet; find the area of an inscribed equilateral triangle.

8 A rectangle whose altitude is 8 feet and whose area is 96 square feet is inscribed in a circle; find the diameter of the circle.

9 The area of a sector is $72\pi$, the angle of the sector is $80^\circ$; find the radius of the sector.

Group IV

10 Construct a right triangle, given one leg and the altitude on the hypotenuse.

11 Prove that if from any point in the circumference of a circle a chord and a tangent are drawn, the perpendiculars to them from the middle point of the lesser arc are equal.

12 ABC is an isosceles triangle inscribed in a circle; the vertical angle B is $30^\circ$ and D is the middle point in the arc BC. If the line AD intersects the chord BC at E, how many degrees are there in the angles DEC and BED?