196TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, September 15, 1908—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting two from each group. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.

Group I 1 Prove that if two parallel lines are cut by a transversal the exterior interior angles are equal.

2 Prove that if two circles intersect, the line of centers is perpendicular to their common chord at its middle point.

3 Prove that if two sides of a triangle are unequal, the angles opposite are unequal, and the greater angle is opposite the greater side.

Group II 4 State the formula for the area of a regular polygon and prove the proposition on which this formula depends.

5 Prove that a line joining the middle points of two sides of a triangle is parallel to the third side and equal to one half of the third side.

6 Define equal figures, similar figures, equivalent figures. What are the essential parts of a theorem? Define each part.

Group III 7 Two tangents drawn from the same external point to a circle form an angle of 64°; find the number of degrees in each of the arcs intercepted by these tangents.

8 Find the radius of a circle whose circumference numerically equals its area.

9 From a point 12 inches from the center of a circle 16 inches in diameter, two tangents are drawn to the circumference; find the length of the chord joining the points of contact.

Group IV 10 Prove that if a circle is circumscribed about an isosceles triangle the tangents drawn through the vertices form another isosceles triangle.

11 Two circles are tangent externally and through the point of contact two straight lines are drawn terminating in the circumferences; prove that the corresponding segments of the lines are proportional.

12 Show how to draw a line terminating in the sides of an angle, which shall be equal to one given line and parallel to another. Give proof.