198TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, June 15, 1909—9.15 a. m. to 12.15 p. m., only

Answer seven questions, selecting three from group I and two from each of the other two groups. Each complete answer will receive 14⅔ credits.

Group I 1 Prove that the perpendicular bisectors of the sides of a triangle meet in a point.

2 Complete and prove the following: An angle formed by a tangent and a chord from the point of contact is measured by . . .

3 Prove that two similar polygons are to each other as the squares of any two homologous sides.

4 On a given line as a chord, construct the segment of a circle that shall contain an angle equal to a given angle.

Group II 5 If a, b and c are straight lines construct a fourth line, x, so that $x = \frac{ab}{c}$. Give proof.

6 A chord 16 inches long is 6 inches from the center of a circle; find the length of a chord that is 5 inches from the center of the same circle.

7 Find (*a*) the number of sides of a regular polygon the sum of whose interior angles is three times the sum of its exterior angles, (*b*) the number of degrees in each angle of a regular decagon.

Group III 8 Prove that the bisectors of the opposite angles of a rhomboid are parallel.

9 Prove that the area of the figure whose vertices are the middle points of the sides of any quadrilateral is equal to half the area of the quadrilateral.

10 AB and CD are non-intersecting chords of the same circle and each is equal to the side of the inscribed square. AB is fixed but CD is movable. AD and BC intersect in P. Find the locus of P.

Or

If a circle is described on the radius of another circle as a diameter, any chord of the greater circle, passing through the point of contact of the circles, is bisected by the circumference of the smaller circle. Prove.