PLANE GEOMETRY

Thursday, September 26, 1907 — 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 two right triangles are equal if a leg and the hypotenuse of the one are equal respectively to a leg and the hypotenuse of the other.

2 Prove that two mutually equiangular triangles are similar.

3 Complete and demonstrate the following: An angle inscribed in a circle is measured by . . . Prove *two* cases.

Group II 4 Prove that if from a point without a circle a secant and a tangent are drawn, the tangent is the mean proportional between the whole secant and its external segment.

5 Prove that the area of a circle is equal to half the product of its radius by its circumference.

6 Complete and demonstrate the following: The areas of two similar polygons are to each other as . . .

Group III 7 The legs of a right triangle are respectively 15 feet and 8 feet; find the length of each segment made on the hypotenuse by the bisector of the right angle.

8 Find the product of the segments of any chord drawn through a point 12 inches from the center of a circle whose radius is 18 inches.

9 Find the area of an equilateral triangle inscribed in a circle whose radius is 4 inches.

Group IV 10 Show how to construct a square which shall be ⅛ the area of a given square.

11 Prove that if in a right triangle one acute angle is 30°, the hypotenuse is double the shorter leg.

12 Prove that two chords drawn perpendicular to a third chord at its extremities are equal.