192D HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, June 18, 1907 — 9.15 a. m. to 12.15 p. m., **only**

Answer eight questions, selecting two from each group.

Group I 1 Prove that two angles whose sides are perpendicular each to each are either equal or supplementary.

2 Complete and demonstrate the following: The sum of the interior angles of a polygon is equal to . . .

3 Prove that the angle between two chords which intersect within a circumference is measured by one half the sum of the intercepted arcs.

Group II 4 Prove that the bisector of an angle of a triangle divides the opposite side into segments which are proportional to the other two sides.

5 Prove that if through a fixed point within a circle two chords are drawn, the product of the two segments of one is equal to the product of the two segments of the other.

6 Prove that the side of a regular hexagon inscribed in a circle equals the radius of the circle.

Group III 7 A point A is 4 feet from the circumference of a circle; the length of a tangent from A to the circle is 10 feet. Find the diameter of the circle.

8 The bases of a trapezoid are respectively 29 feet and 37 feet and its area is 247.5 square feet; find its altitude.

9 The radius of a circle is 6 feet; find the diameter of a circle one third as large.

Group IV 10 Show how to divide a given rectangle into four equivalent parts by lines drawn from one of the vertices of the rectangle. Give proof.

11 Given a straight line and two points on the same side of that line and at unequal distances from it, construct a circumference passing through the two points and having its center in the given line.

12 Prove that the area of a square inscribed in a circle is twice the square of the radius of the circle.