190TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, September 18, 1906 — 9.15 a. m. to 12.15 p. m., only

Answer eight questions, including at least one from each of the three divisions. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.

First division

1 Define angle, median of a triangle, similar polygons, sector, segment.

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

3 Complete and demonstrate the following: An angle formed by a tangent and a chord is measured by . . .

4 Complete and demonstrate the following: The area of a trapezoid is equal to . . .

Second division

5 The three sides of a triangle are 20 feet, 16 feet and 12 feet respectively; find the segments of the shortest side made by the bisector of the angle opposite that side.

6 In a regular polygon of 15 sides, find the number of degrees in (1) each interior angle, (2) each exterior angle.

7 The radius of a circle is 9 feet; find the side of the circumscribed hexagon.

8 The sides of a triangle are respectively 4 inches, 13 inches and 15 inches; find the length of each side of a similar triangle whose area is ⅛ as large. State the theorem employed.

Third division

9 Show how to construct a triangle having given the angles and the sum of the three sides.

10 Show how to construct a circle which shall be tangent to three given lines no two of which are parallel.

11 Prove that the shortest line that can be drawn from a point within a circle to the circumference is the shorter segment of the diameter through that point.

12 Prove that the median of a trapezoid bisects both diagonals of the trapezoid.