Examination Department

143D EXAMINATION

PLANE GEOMETRY

Wednesday, March 24, 1897-9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

Answer to questions but no more. If more than to questions are answered only the first 10 of these answers will be considered. Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically. Each complete answer will receive 10 credits.

1 Define parallel lines, diagonal, perpendicular, tangent, similar segments.

2 Prove that two triangles are similar if the three angles of one are equal respectively to the three angles of the other.

3 Prove that two triangles are equal if the three sides of one are equal respectively to the three sides of the other.

4 Complete and demonstrate the following: The square described on the difference of two lines is equivalent to .

- 5 Prove that the bisector of an angle of a triangle divides the opposite side into segments proportional to the adjacent
- 6 Demonstrate the following and give one corollary: Parallelograms having equal bases and equal altitudes are equiva-
- 7 In a right triangle the sides about the right angle are 12 feet and 9 feet; find the length of the perpendicular from the vertex of the right angle to the hypotenuse.

8 Show how to construct a circle tangent to two given lines

and touching one of them at a given point.

9 Prove that the line drawn from the vertex of the right angle to the middle point of the hypotenuse of a right triangle is equal to one half the hypotenuse.

10 Given the lengths of the lines a and b, construct a line

x so that $x = \frac{1}{a}$. Give proof.

II Find the length of the longest and of the shortest chord that can be drawn through a point 8 inches from the center of a circle whose radius is 12 inches.

12 The sides of a triangle are 13 feet, 14 feet and 15 feet;

find the area of the triangle.

13 Prove that if the middle points of the sides of a triangle are joined by straight lines, the four triangles thus formed will be equal and each will be similar to the given triangle.

14 Assuming that the circumference of a circle is equal to

 πD , prove that its area is equal to πR^2 .

15 Construct an equilateral triangle equivalent to a given square.