Examination Department

142D EXAMINATION

PLANE GEOMETRY

Wednesday, January 27, 1897 — 9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more.** *If more than 10 questions are answered only the first 10 of these answers will be considered. Division of groups is not allowed. 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 *line, surface, polygon, angle, theorem.*

2 Prove that if two parallel straight lines are cut by a third straight line the exterior-interior angles are equal.

3 Prove that if two chords intersect in a circle their segments are reciprocally proportional.

4–5 Complete the statement of the following and demonstrate: In any obtuse-angled triangle the square of the side opposite the obtuse angle is equal to . . .

6 Prove that a straight line perpendicular to a radius at its outer extremity is tangent to the circle. State the converse of this theorem.

7 State and demonstrate a theorem whose conclusion is, . . . "the triangles are similar."

8 Show how to construct a mean proportional between two given lines. Give proof.

9 The diagonals of a rhombus are 36 feet and 40 feet respectively. Compute its area.

10 The parallel sides of a trapezoid are 125 feet and 185 feet respectively, and the other sides are each 50 feet; find the area of the trapezoid.

11 Show how to construct a tangent to a circle from a point without the circle. Give proof.

12 Given the altitude and one of the equal angles of an isosceles triangle; show how to construct the triangle.

13 Show how to draw a tangent to a given circle which shall also be perpendicular to a given straight line.

14 Divide a given triangle into two equivalent parts by a line drawn parallel to one of its sides.

15 The area of the ring included between the circumferences of two concentric circles is a square feet, the distance between the two circumferences is b feet; find the radii of the two circles.