University of the State of New York

Examination Department

138TH EXAMINATION

PLANE GEOMETRY

Wednesday, June 17, 1896—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 *polygon, perimeter, apothem, problem, scholium.*

2–3 Complete and demonstrate the following: In any triangle the square of a side opposite an acute angle is equal to . . .

4–5 Prove that two triangles having an angle in each equal and the including sides proportional are similar.

6 Prove that a line drawn parallel to the base of a triangle divides the other sides proportionally. (Give two cases.)

7 Construct a tangent to a circle from a given point outside the circumference. Give proof.

8 The legs of a right triangle are 8 feet and 9 feet respectively; find the radius of the circumscribed circle.

9 Show how to construct a fourth proportional to three given lines.

10 Describe the process by which the value of π is obtained.

11 Find the area of a regular hexagon whose side is 5 feet.

12 Two circumferences whose radii are 10 feet and 6 feet respectively intersect in such a way that their common chord is 5 feet; find the distance between their centers.

13 Show how to construct a square equivalent to a given triangle.

14 Prove that a line drawn perpendicular to either leg of a right triangle at its middle point passes through the middle point of the hypotenuse.

15 How many linear feet of iron bars will be required for a set of tires for a wagon, the diameters of whose wheels are 4 feet 8 inches and 4 feet 2 inches respectively?