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*University of the State of New York*

# Examination Department

117th examination

## PLANE GEOMETRY

**Wednesday,** November 29, 1893 — 9 : 15 a. m. to 12 : 15 p. m., only

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100 *credits, necessary to pass,* 75

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

1 Define and illustrate *complementary angles, rhomboid, isosceles triangle, trapezoid, similar sectors.*

2 Prove that if two parallel lines are cut by a third straight line the sum of the two interior angles on the same side of the secant is equal to two right angles.

3 Two sides of a triangle are 6 feet and 7 feet respectively; what are the numeric limits of the third side? Demonstrate.

4 Prove that the three perpendiculars erected at the middle points of the three sides of a triangle meet in a point.

5 Prove that the diagonals of a parallelogram bisect each other. The adjacent sides of a parallelogram are 3 feet and 4 feet respectively; what are the numeric limits of the sum of the diagonals?

6 Prove that the sum of the interior angles of a polygon is equal to two right angles, taken as many times less two as the figure has sides.

7 A regular polygon has 11 sides; what is the sum of four of its interior angles?

8 From a point without a straight line let fall a perpendicular on that line. Construct and demonstrate.

9 Bisect a given angle. Demonstrate.

10 The base and altitude of a right triangle are 6 feet and 8 feet respectively; what is the length of the perpendicular drawn from the vertex of the right angle to the hypotenuse?

11 Find a mean proportional between two given lines. Demonstrate.

12 Two intersecting chords of a circle are 38 feet and 34 feet respectively; the segments of the first are 8 feet and 30 feet; what are the segments of the other?

13 Find the area of a regular hexagon inscribed in a circle 2 feet in diameter.

14 Find the area of a square inscribed in a circle 2 feet in diameter.

15 Construct a square equal to the sum of two other given squares. Demonstrate.