University of the State of New York
Examination Department
150TH EXAMINATION
PLANE GEOMETRY
Wednesday, January 26, 1898 — 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 *are answered only the first* 10 *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 *scalene triangle, incommensurable quantities, similar figures, plane, secant.*

2 Prove that every point on the perpendicular bisector of a straight line is equidistant from the extremities of that line.

3 How many and what parts of two triangles must be equal in order that the triangles shall be equal? Prove one theorem that concludes 'the triangles are equal.'

4 Prove that if one of the acute angles of a right triangle is 60° the hypotenuse is double the shorter side.

5 Prove that in a parallelogram (*a*) the opposite sides are equal, (*b*) any two consecutive angles are supplementary.

6 Prove that in the same circle or equal circles equal chords are equally distant from the center.

7 A quadrilateral *abcd* is inscribed in a circle so that *ab* subtends an arc of 130°, *bc* an arc of 20°, *cd* an arc of 120°; find the angle formed by the diagonals of this quadrilateral.

8 Prove that similar triangles are to each other as the squares of their homologous sides.

9 Write the formula for the area of a circle in terms of the radius. Give an outline of the method by which this formula is derived.

10 Given three lines *a*, *b* and *c*. Show how to construct a line *x* so that $x = \dfrac{bc}{a}$. State a theorem used.

11 Construct an angle of 60°; of 120°; of 30°; of 45°. Show clearly in each case the method of construction.

12 A trapezoid each of whose legs is 5 inches in length has an upper base of 8 inches and a lower base of 16 inches; find the altitude and the area of this trapezoid.

13 Find the length in inches of an arc of 36° on a circumference whose radius is 3½ feet.

14–15 Bisect a triangle by a line parallel to one side. Give proof.