New York State Education Department

EXAMINATION FOR QUALIFYING CERTIFICATES

PLANE GEOMETRY

Tuesday, September 10, 1912 — 9.15 a. m. to 12.15 p. m., only

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Answer eight questions, selecting two from each group. Each complete answer will receive 12½ credits. Papers entitled to less than 75 credits will not be accepted.

Group I

1 Prove that two right triangles are equal if the hypotenuse and one side of the one are equal respectively to the hypotenuse and one side of the other.

2 Prove that the diagonals of a parallelogram bisect each other.

3 Complete and prove the following: An angle formed by two chords intersecting within a circle is measured by . . .

Group II

4 State *three* theorems in regard to a mean proportional.

5 Construct a triangle equivalent to a given quadrilateral.

6 Prove that an inscribed equilateral polygon is regular.

Group III

7 Prove the following: If in a right triangle a perpendicular is drawn from the vertex of the right angle to the hypotenuse, three pairs of similar triangles will be formed.

8 Two circles are externally tangent and a secant is drawn through the point of contact and terminated by the two circumferences. Prove that the two minor arcs formed have equal measures.

9 Find by a construction a point which lies in one side of a triangle and is equidistant from the other two sides.

Group IV

10 The sides of a parallelogram are 12 and 18 and one angle is 30°; find its area.

11 What is the width of the ring between the circumferences of two concentric circles whose circumferences are 48 ft and 36 ft respectively?

12 The homologous sides of two similar triangles are in the ratio of 5:3; how many times is the area of the smaller triangle contained in the area of the larger?