New York State Education Department

209TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Tuesday, June 17, 1913—9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in plane geometry. Name the author of the textbook you have used in your study of plane geometry.

Answer the first four questions and three of the others.

1 State *four* theorems the conclusion of each of which implies that two lines (sides, chords, tangents etc.) are equal. [12]

2 Prove *one* of the theorems stated in answer to question 1. [14]

3 Prove that two similar triangles are to each other as the squares of any two homologous sides. [16]

4 Given a square; construct a square whose area is three times the area of the given square. [Show *all* construction lines. No proof or explanation required.] [16]

5 Prove the correctness of the following construction for bisecting the angle ABC: On AB produced beyond B take $BD=BC$ and draw a line through B parallel to DC. [14]

6 Two equal chords produced meet outside the circle; prove that the secants thus formed are equal. [14]

7 Draw a square $ABCD$. On the diagonal AC take the point E so that $AE=AB$ and draw through E a perpendicular to AE cutting BC in F. Prove $BF=EC$. [14]

8 The sides of a triangle are 9, 12 and 18; compute the lengths of the two segments into which the longest side is divided by the bisector of the opposite angle. [14]

9 A triangle ABC is inscribed in a circle; the angle B is 35°, the minor arc AB is 120°. What angle does a tangent at A make with BC produced to meet the tangent? [14]

10 How many sides are there in the polygon each of whose interior angles is 175°? [14]