The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

PLANE GEOMETRY

Tuesday, September 10, 1918—9.15 a. m. to 12.15 p. m., only

Answer eight questions. Papers entitled to less than 75 credits will not be accepted.

1 Prove that if one side of a triangle is greater than a second side, the angle opposite the first side is greater than the angle opposite the second side.

2 Prove that an angle formed by two secants meeting without the circle is measured by one half the difference of the intercepted arcs.

3 Prove that the bisector of an angle of a triangle divides the opposite side into segments proportional to the adjacent sides.

4 Prove that the areas of two similar triangles are to each other as the squares of any two corresponding sides.

5 Prove that the lines which join the mid points of the sides of a rhombus form a rectangle.

6 Prove that the sum of the legs of a right triangle equals the sum of the hypotenuse and the diameter of the inscribed circle.

7 In a triangle whose base is 24 and whose altitude is 18 the altitude is bisected by a line parallel to the base; find the area of the triangle cut off.

What part of the altitude must be cut off in order that the area of the triangle may be bisected?

8 The sum of the areas of two circles is 20 and the difference of their areas is 15; find their radii.

9 Taking any line as 1, construct a line equal to $\sqrt{2}$, and also one equal to $\sqrt{6}$.

10 Construct a circle which shall touch a given line AB at P and pass through a given point C outside the line.

11 The diameter of a bicycle wheel is 28 inches; how many revolutions does the wheel make in going 10 miles?