The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

PLANE GEOMETRY

Tuesday, September 12, 1916—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 the diagonals of a parallelogram bisect each other.

2 Prove that if two triangles have an angle of one equal to an angle of the other and the sides including these angles proportional, the triangles are similar.

3 Prove that the area of a triangle is equal to one half the product of its base and its altitude.

4 Prove that the locus of points within an angle and equally distant from its sides is the bisector of the angle.

5 Inscribe a circle in a sector. Make construction with compass and ruler and show all construction lines. No proof required.

6 Find the radius of a semicircle which is equivalent to an equilateral triangle whose side equals 8.

7 Write the formula or rule for finding the area of *each* of the following: parallelogram, trapezoid, regular polygon, circle, triangle with three sides given, sector.

8 If two equal circles of radius r intersect so that each passes through the center of the other, find the length of the common chord, and the area of the figure which lies within both circles.

9 The difference between the areas of the squares circumscribed about two circles is 50 square inches, and the difference between the diameters of the circles is 4 inches; find each diameter.

10 Two unequal circles intersect in the points A and B. Through A a line is drawn meeting the larger circle in C and the smaller in D, and through B a line is drawn meeting the larger circle in E and the smaller in F. Prove that the lines CE and DF are parallel.

11 If the perimeter of each of the figures, equilateral triangle, square and circle, is 396 feet, what is the area of each figure?