

University of the State of New York

77TH EXAMINATION

PLANE GEOMETRY

TUESDAY, June 9, 1891—9:15 A. M. to 12:15 P. M., only

40 credits, necessary to pass, 30

NOTE.—Draw carefully and neatly each figure in construction or proof, using letters instead of numbers. Arrange work clearly and logically.

1. Define and represent by a figure (*a*) a right angle; (*b*) the segment of a circle; (*c*) equivalent figures. 6
 2. How many degrees in the angle whose supplement is four times its complement? 1
 3. Two sides of a triangle are 30 inches and 20 inches respectively; what is the least and what the greatest length, in inches, the third side can have? Give the reason for your answer. 2
 4. What is the sum of the two angles adjacent to either of the non-parallel sides of a trapezoid? State the reason for your answer. 3
 5. Prove that the angle formed by two intersecting chords is measured by one-half the sum of the intercepted arcs. 4
 6. Prove that two triangles are similar, if an angle of one equal an angle of the other and the including sides are proportional. 6
 7. Prove that the areas of two similar triangles are to each other as the squares of any two homologous sides. 6
 8. Construct 2
 - (*a*) a square, whose diagonal is given. 2
 - (*b*) an equilateral triangle whose base is given. 1
- Prove the correctness of each construction. 4
9. From the end of a tangent 30 inches long a secant is drawn through the centre of the circle; find the radius of the circle when the exterior segment of this secant is 10 inches. 3
 10. A tree casts a shadow 90 feet long when the length of the shadow of a vertical rod 6 feet high is 4 feet; find the height of the tree. 2