

University of the State of New York

75TH EXAMINATION

PLANE GEOMETRY

TUESDAY, Jan. 20, 1891—9:15 A. M. to 12:15 P. M., only

40 credits, necessary to pass, 30

1. Define and represent by a figure each of the following terms :
 (a) supplement of an angle ; (b) locus of a point ; (c) apothem ;
 (d) inscribed angle. 4
2. One angle of an oblique triangle is seven-eighths of a right angle, what is the value of the adjacent exterior angle? 1
3. Prove that, if two parallel lines are cut by a third line, the exterior-interior angles are equal. 2
4. Prove that, in the same or equal circles, two angles at the centre have the same ratio as their intercepted arcs. (2 cases.) 6
5. Prove that, if four quantities are in proportion, they are in proportion by composition. 3
6. Prove that the perpendicular from any point of the circumference of a circle to its diameter is a mean proportional between the segments of that diameter. 4
7. Prove that the area of a regular polygon equals one-half the product of its apothem and perimeter. 2
8. Construct the following and prove that each result satisfies the required conditions :
 - (a) Construct a square equivalent to a given parallelogram; 3
 - (b) Construct a triangle, given a side and two angles; 3
 - (c) Circumscribe a circle about a given triangle; 4
 - (d) Inscribe a regular polygon of eight sides in a given circle. 4
9. The sides of a triangle are 12, 15 and 18; find the segments of the side 18, made by the bisector of the opposite angle. 4