# University of the State of New York.

37TH ACADEMIC EXAMINATION.

## PLANE GEOMETRY.

TUESDAY, March 4, 1890—Time, 9:30 A. M. to 12:30 P. M., only.

36 *credits, necessary to pass,* 27.

1. Define and illustrate by a figure each of the following: angle; perpendicular lines; parallel lines; altitude of a triangle; trapezium; arc of a circle; diameter of a circle; similar polygons; hypothesis ..... 9

2. State three cases in which two triangles may be proven equal in all respects ..... 3

3. Prove that a straight line perpendicular to a radius at its extremity is a tangent to the circle ..... 3

4. Prove that if in a right triangle a perpendicular be drawn from the vertex of the right angle to the hypotenuse, the perpendicular is a mean proportional between the segments of the hypotenuse ..... 3

5. Prove that the area of a parallelogram is equal to the product of its base and altitude ..... 3

6. Prove that the area of a regular polygon is equal to one-half the product of its apothem by its perimeter ..... 3

7. Make the following constructions and show that each construction meets the conditions required:

(*a*) To find a fourth proportional to three given straight lines ..... 2

(*b*) To construct a square equivalent to the difference of two given squares ..... 2

(*c*) To inscribe in a circle a regular hexagon ..... 2

8. Given that every line drawn through the centre of a parallelogram is bisected by the centre, prove that any such line divides the perimeter into two equal parts ..... 3

9. If a carriage-wheel makes 220 revolutions in traveling half a mile, find its diameter ..... 3