

# 8 University of the State of New York.

28th Advanced Academic Examination.

## PLANE GEOMETRY.

June, 1887—Time three hours only.

36 credits, necessary to pass, 27.

1. Define and illustrate by a figure each of the following : obtuse-angled triangle ; rhomboid ; tangent ; secant ; segment ; inscribed angle..... 6
2. Give in degrees (*a*) the sum of the angles of any triangle ; (*b*) in an isocetes right-angled triangle the value of each acute angle. When are two triangles similar?..... 3
3. Prove that the exterior angle of any triangle is equal to the sum of the two opposite interior angles..... 2
4. Prove that if two straight lines meet a third straight line, making the sum of the interior angles on the same side equal to two right angles, the two lines will be parallel..... 2
5. Prove that if two angles have their sides parallel, and lying either in the same, or in opposite directions, they will be equal. 2
6. Prove that if four quantities are in proportion, they will be in proportion by inversion..... 2
7. Prove that an angle formed by a tangent and a chord meeting it at the point of contact, is measured by half the included arc..... 2
8. What is the measure (*a*) of an angle formed by two chords that intersect ; (*b*) of an inscribed angle ; (*c*) of an angle formed by two secants?..... 3
9. Prove that two triangles having an angle of the one equal to an angle of the other are to each other as the products of the sides including the equal angles..... 3
10. What is a regular polygon? What is the sum of the angles in a polygon? When is a polygon said to be inscribed in a circle?..... 3
11. Make and explain the following constructions :
  - (*a*) To draw the circumference of a circle through three points not in the same straight line..... 2
  - (*b*) Given the base, the altitude, and an angle at the base, of a triangle, to construct the triangle..... 2
  - (*c*) To construct a square equivalent to the sum of two given squares..... 2
12. The perpendicular distance between two parallel lines is 40 feet, a line is drawn across them at an angle of  $45^\circ$ . Find its length between the parallels..... 2