University of the State of New York

76TH EXAMINATION

PLANE GEOMETRY

WEDNESDAY, March 4, 1891—9:15 A. M. to 12:15 P. M., only

40 credits, necessary to pass, 30

Credits allowed each answer depend on its completeness and accuracy.

1. Define and represent by a figure each of the following terms: (a) parallel lines ; (b) an inscribed polygon ; (c) the antecedents of a proportion ; (d) the homologous sides of equal triangles.   4

2. The first angle of a triangle is twice as large as the second ; the third angle is three times as large as the first ; find the value of each angle in degrees.   1

3. Is it possible to form triangles the lengths of whose sides are (a) 4 feet, 3 feet and 7 feet ; (b) 2 feet, 3 feet and 7 feet ? Give reasons for your answers.   2

4. Find the value in degrees of an angle of a regular decagon. 1

5. Prove that (a) every point in the perpendicular through the middle of a straight line is equally distant from the extremities of the line ; (b) every point without the perpendicular is unequally distant from the extremities of the line.   4

6. Prove that the angle formed by a tangent and a chord is measured by one-half the intercepted arc.   3

7. Prove that (a) the perpendicular drawn to the hypotenuse of a right triangle from the vertex of the right angle, is a mean proportional between the segments of the hypotenuse ; (b) either side about the right angle is a mean proportional between the hypotenuse and the adjacent segment.   6

8. Construct the following and prove that the required conditions are satisfied :

(a) Construct a square equivalent to a given triangle.   4

(b) Draw a tangent to a given circle from a given point without the circle.   4

(c) Circumscribe a hexagon about a given circle.   3

9. What is the length of a side of the largest square that can be cut out of a circular piece of wood whose radius is 1 foot 8 inches?   2

10. Two circles whose centres are 8 inches apart touch each other ; if the radius of one circle is 5 inches, what would be the radius of the other ? (2 cases ; represent each by a figure.)   3

11. Find in degrees the value of the angle formed by two tangents whose points of contact are the extremities of an arc of 45 degrees.   3