University of the State of New York

Examination Department

138TH EXAMINATION

PLANE TRIGONOMETRY

Thursday, June 18, 1896—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more.** *If more than 10 questions are answered only the first 10 of these answers will be considered. Division of groups is not allowed. A, B and C represent the angles of a triangle, a, b and c the opposite sides and S the area. In a right triangle C represents the right angle and c the hypotenuse. Each complete answer will receive 10 credits.*

1 Define *negative angle, tangent, cosecant, solution of a triangle, logarithm.*

2 State and explain the rule for finding the characteristic of the logarithm of an integral number; of a decimal number.

3 Refer each of the following angles to its proper quadrant: 289°, 186°, 168°, —80°, —188°. Explain each answer.

4 Construct the negative functions of an arc in the second quadrant. Designate each negative function by name.

5 Express each function of A in terms of tan A.

6 Prove that cos A is equal to sin A ctn A; cos A is less than ctn A; cos A is not greater than 1.

7 Deduce the values of all the functions of 30°.

8 Prove that tan $(180° - A) = -\tan A$ and tan $(180° + A) = +\tan A$.

9–10 Compute the values of sin B, cos B, a and c of a right triangle, when tan $A = \frac{3}{5}$ and $b = 50$.

11 Prove that in any plane oblique triangle $a + b : a - b = \tan \frac{1}{2}(A + B) : \tan \frac{1}{2}(A - B)$.

12–13 Derive the formulas for computing C, b, c and S of an oblique triangle when A, B, and a are given.

14–15 A tree stands on the side of a hill. Show what measurements must be made and what formulas are necessary to find h, the hight of the tree; d, the distance from the observer to the top of the tree; d', the distance from the observer to a point in the plane of the observer directly under the tree.