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University of the State of New York

Examination Department

131st examination

PLANE TRIGONOMETRY

Thursday, June 13, 1895 — 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. In questions 3, 4-5, 10, 12, 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 and illustrate *negative angle, complement of an angle, sine, angle of third quadrant, oblique triangle.*

2 Construct the *negative* functions of an arc in the second quadrant, designating each negative function by name.

3 Construct a right triangle having $c = 5$ and $\cot A = \frac{7}{3}$.

4-5 In a right triangle $b = 22$ feet and $\sin A = .42$; find a, c, $\sin B$, $\tan B$ and S.

6 Given $\cos A = -\frac{3}{5}$; find the values and signs of the other functions of A.

7 Find *six* trigonometric functions of 60°.

8 Prove that $\sin (A-B) = \sin A \cos B - \cos A \sin B$.

9 Arrange in a table the value, with proper sign, of sine, tangent and cosine of *each* of the following : 0°, 90°, 180° and 270°.

10 Prove that in any plane triangle $a : b = \sin A : \sin B$.

11 Given $\log 8 = .903$ and $\log 9 = .954$; find the logarithms of 2, 3, 12, 500, .075.

12 In a triangle given a, b and c; explain how to find A, B and C.

13 Prove that $\sin A = \cos A \tan A$; $\sec^2 A = 1 + \tan^2 A$.

14 Prove that $\cos 2A = \cos^2 A - \sin^2 A$;
$$2 \sin^2 \tfrac{1}{2} A = 1 - \cos A.$$

15 Only one of two objects on different sides of a lake is accessible. Show what measurements and what computations are necessary to find m, the distance from the observer to the inaccessible object, and n, the distance between the objects.