University of the State of New York

Examinations Department

80th examination

PLANE TRIGONOMETRY

Thursday, March 17, 1892—9 : 15 a. m. to 12 : 15 p. m., only

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40 *credits, necessary to pass*, 30

NOTE.—Draw carefully and neatly each figure, using letters instead of numerals. Arrange work logically.

1. Define (a) quadrant; (b) complement of an angle; (c) natural tangent; (d) logarithmic sine; (e) horizontal angle. 5

2. Name each function of an angle of a triangle which may be negative. State when the function would be negative and why. 4

3. Trace the changes in value and sign of sin A as A increases from 0° to 360°. 4

4. (a) Find the value of A when $\cot \frac{1}{2} A = \tan A$. 2

(b) When $m = \tan A + \sin A$ and $n = \tan A - \sin A$, prove that $\frac{m-n}{m+n} = \cos A$. 3

5. Show how to find the value of cos 30° and tan 15° when $\sin 30° = \frac{1}{2}$. 5

6. Let A, B and C represent the angles of an oblique triangle and a, b and c their opposite sides respectively; prove that

(a) $\tan \frac{1}{2} (A + B) = \cot \frac{1}{2} C$. 2

(b) $a + b : a - b = \tan \frac{1}{2} (A + B) : \tan \frac{1}{2} (A - B)$. 4

7. Given a and b the adjacent sides of a parallelogram and C the included angle, to find the formula for computing (a) the longer diagonal; (b) the area. 5

8. A tree stands on an inaccessible hill. From a point N of a plain the angles of elevation to the top and the bottom of the tree are $A°$ and $B°$ respectively. At a point M of the plain, d feet back from N and in line with the tree, the angle of elevation to the top of the tree is C°. Show how to obtain the formula by which h, the height of the tree may be computed. 6