University of the State of New York

38TH ACADEMIC EXAMINATION

PLANE TRIGONOMETRY

THURSDAY, June 12, 1890—Time, 9:15 A. M. to 12:30 P. M., only

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36 *credits, necessary to pass,* 27

1. Define trigonometry; logarithm; logarithmic sine; complement of an angle..... 4

2. Trace the changes in sign and magnitude of tan **A** as **A** increases from 0° to 360°. Illustrate with diagram..... 4

3. Log 8 = .90309; log 12 = .1.07918. What is the log of $\frac{2}{3}$? 4

4. Find by geometric principles the sin, tan, and sec, of 45° and show their relations to the cos, cot, and cosec of the same angle.

5. Complete the following equations:

(a) $\sin(a+b) =$

(b) $\cos(a+b) =$

(c) $\sin(a-b) =$

(d) $\cos(a-b) =$ 4

6. Prove equation (b) in the last question..... 2

7. Prove (a) $\cot 2a = \dfrac{\cot^2 a - 1}{2 \cot a}$..... 2

(b) $\sin p + \sin q = 2 \sin \frac{1}{2}(p+q) \cos \frac{1}{2}(p-q)$.. 2

8. State and demonstrate the theorem employed in solving a triangle of which the three sides are given..... 4

9. Required the height of a wall whose angle of elevation, at a distance of 463 feet, is observed to be 16° 21′. Give the formulas for the solution..... 2

10. Explain by means of a diagram how to determine the distance between the summits of two towers seen from the opposite side of a river..... 4