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University of the State of New York

Examination Department

124th examination

PLANE TRIGONOMETRY

August 1894 — Three hours, only

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100 *credits, necessary to pass,* 75

Answer 10 questions but no more. *Division of groups is not allowed. If more than 10 questions are answered only the first 10 of these answers will be considered Draw carefully and neatly each figure, using letters instead of numerals. Arrange work logically. Each complete answer will receive 10 credits.*

1 Define *negative angle, solution of a triangle, logarithm, supplement of an arc, complement of an angle.*

2 Name and define five trigonometric functions.

3–4 Derive the formulas necessary for the solution of right-angled triangles.

5–6 Prove that the sides of a plane triangle are proportional to the sines of their opposite angles. Mention an application of this principle.

7–8 Given two sides of a plane triangle and an angle opposite one of them to find the remaining parts. When will there be two solutions?

9–10 The sides of a triangle are 8 ft, 10 ft, 12 ft, respectively; find one function of each of the angles.

11–12 The sine of an angle is $\frac{1}{2}$; determine the cosine, the tangent, the cotangent, the secant and the cosecant.

13–14 Derive the following :

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

15 Show how to determine the length of a degree of longitude on any parallel.