University of the State of New York
Examination Department
154TH EXAMINATION
PLANE TRIGONOMETRY
Thursday, June 16, 1898 — 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 are answered only the first 10 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, 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 *cosecant, logarithm, quadrant, supplement of an angle, oblique triangle*.

2 Show in tabular form the signs of six trigonometric functions in each of the four quadrants.

3 Express as a function of an angle less than $45°$ *each* of the following: $\sin 185°$, $\tan 267°$, $\sec 345°$, $\cos 87°$, $\cot -19°$.

4 Prove that $\cot A = \operatorname{cosec} A \cos A$; $\tan^2 A = \sec^2 A - 1$.

5 Construct a right triangle one of whose legs is 3 and the sine of the adjacent acute angle $\frac{2}{5}$.

6 Prove that $\sin (x+y) = \sin x \cos y + \cos x \sin y$.

7 Express in terms of functions of A *each* of the following: $\sin 2A$, $\cos 2A$ (*three* different forms), $\tan 2A$.

8 If $\tan A = \frac{3}{4}$ find the other functions of A, noting the signs.

9 Derive a formula used in finding the area of a right triangle.

10 Given $\log 2 = .3010$, $\log 3 = .4771$; find $\log \frac{1}{24}$, $\log .25$, $\log 16.2$, $\log \sqrt{\frac{8}{9}}$, $\log \sin 30°$.

11 Given two sides and an included angle of a triangle; derive the formula for finding the third side.

12 Given the three sides of a triangle; derive the formula for finding the angles.

13 Prove that $\sin 105° + \cos 105° = \cos 45°$.

14-15 What measurements must be made by an observer on the shore to find the distance between two buoys? Give formulas necessary for solving.