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University of the State of New York

Examination Department

118th examination

PLANE TRIGONOMETRY

Thursday, January 25, 1894—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer any 10 questions but no more. *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 and illustrate, *angle of third quadrant, secant, logarithmic sine.*

2–3 Construct (*a*) an angle whose sine equals $\frac{2}{3}$; (*b*) a right triangle whose hypotenuse equals 5 and the tangent of one of whose acute angles equals $\frac{5}{7}$.

4–5 Construct the *negative* functions of an arc (*a*) in the second quadrant; (*b*) in the fourth quadrant. Designate each *negative* function by its name.

6–7 When $\tan A=\frac{5}{12}$, what is the value of each of the other functions of *A*? What functions of *A* are the reciprocals of $\sin A$, $\tan A$, and $\sec A$ respectively?

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

9 Prove that (*a*) $2 \sin^2 \frac{1}{2} A=1-\cos A$; (*b*) $2 \cos^2 \frac{1}{2} A=1+\cos A$.

10 Given $\log 14=1.14613$, $\log 15=1.17609$ and $\log 16=1.20412$. Find the logarithm of each number from 2 to 9 inclusive.

11 State each case of the solution of right triangles and give all the formulas necessary to completely solve one of these cases.

12–13 Find the formula representing the area of an oblique triangle having given (*a*) two sides and included angle; (*b*) two angles and included side.

14 What measurements must be made on a horizontal plane at the base of a hill, and what formulas are necessary to find the hight of a tower standing on the summit of the hill?

15 Find the formula representing the area of a right triangle, having given (*a*) the hypotenuse and one acute angle; (*b*) one acute angle and its opposite side.