University of the State of New York
77th Examination

PLANE TRIGONOMETRKY

THURSDAY, JUNE 11, 1891—9:15 A. M. TO 12:15 P. M., ONLY

40 CREDITS, NECESSARY TO PASS, 30

NOTE. — Draw carefully and neatly each figure in construction or proof, using letters instead of numbers. Arrange work clearly and logically.

A represents an acute angle, c, the hypotenuse of a right triangle, a, the side opposite A, and b, the adjacent side.

1. Find sin A, ctn A and their reciprocals, when cos A = \( \frac{3}{5} \).
2. Construct a right triangle, in which c = 5 and tan A = \( \frac{3}{2} \).
3. Prove that sin A = tan A cos A.
4. Express cos 150° in terms of an angle (or arc) less than 45°.
5. Given sin (A + B) = sin A cos B + cos A sin B
   and tan (A + B) = \( \frac{\tan A + \tan B}{1 - \tan A \tan B} \)
   find (a) sin (180° - B); (b) tan (90° + B).
6. Let A, B and C represent the angles of an oblique triangle, and a, b and c their opposite sides respectively; prove that

\[ a \sin B = b \sin A. \]

NOTE. — Write two formulae for the quantity required in each of the questions 7, 8 and 9, one for computing the value without using logarithms, the other for computing this value by using logarithms.

7. A monument a feet high is situated on a plain. At a certain point of the plain the angle of elevation is A degrees; find the formula for computing the distance from this point to the foot of the monument.

8. Find the formula for the area of a trapezoid, whose non-parallel sides are equal, a and b representing the parallel sides and A an acute angle.

9. Two corners of a field have between them an impassable morass. It is desired to know the distance between these corners. Represent this distance by d and by means of a figure show the measurements and formula necessary to compute d.