

University of the State of New York

77TH EXAMINATION

PLANE TRIGONOMETRY

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 $\sin A$, $\cot A$ and their reciprocals, when $\cos A = \frac{3}{5}$. 6
2. Construct a right triangle, in which $c = 5$ and $\tan A = \frac{3}{2}$. 3
3. Prove that $\sin A = \tan A \cos A$. 3
4. Express $\cos 150^\circ$ in terms of an angle (or arc) less than 45° . 2
5. Given $\sin(A+B) = \sin A \cos B + \cos A \sin B$

$$\tan A + \tan B : \\ \text{and } \tan(A+B) = \frac{\quad}{1 - \tan A \tan B}$$

find (a) $\sin(180^\circ - B)$; (b) $\tan(90^\circ + B)$. 8

6. Let A , B and C represent the angles of an oblique triangle, and a , b and c their opposite sides respectively; prove that

$$a \sin B = b \sin A. \quad 3$$

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. 4

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. 5

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 . 6