University of the State of New York.

28th Advanced Academic Examination.
PLANE TRIGONOMETRY.
June, 1887—Time two and one-half hours only.

36 *credits, necessary to pass,* 27.

1. Draw a figure showing the complement of 30°; the supplement of 60° 2

2. Draw a figure and upon it indicate the sine, tangent and secant of 100° 3

3. Prove that $\tan a = \dfrac{\sin a}{\cos a}$ 1

4. Prove that $\sin (a + b) = \sin a \cos b + \cos a \sin b$ 4

5. Assuming the formulae for the sum and difference of two arcs, prove that $\sin p - \sin q = 2 \sin \frac{1}{2} (p - q) \cos \frac{1}{2} (p + q)$. 4

6. Of what two parts does every logarithm consist; which of these is always positive, and which may be negative? 4

7. Explain the difference between a natural sine and a logarithmic sine 2

8. In any triangle how many and what parts must be known that the remaining parts may be computed? 2

9. In the triangle A B C right angled at C, give the formulæ:
   (a) To find a and c when b and B are given 2
   (b) To find a when b and c are given 1

10. In the oblique angled triangle A B C, give the formulæ:
    (a) To find C, b and c, when A, B and a are given 3
    (b) To find b and B, when a, c, and A are given 2
    (c) To find b and A, when c, a, and B are given 2

11. Show what measurements should be made and give the necessary formulæ to determine the distance between two points, both visible but inaccessible 4

☞ *Carefully read and obey the following directions :*

☞ Do you now, at the close of this examination, conscientiously declare that you had no previous knowledge of the questions to be proposed, that you have neither given to any other scholar, nor received from any source, explanation or other aid in answering any of them. If so, write *in the next line after the end of your set of answers,* near the right side of the paper, the words

"*I do SO declare.*"

and underneath *subscribe* your name.

☞ Every set of papers lacking this *full declaration* and *signature,* however satisfactory, in other respects, will be rejected, on the presumption that the required declaration could not conscientiously be made.

☞ Fold your MS. in proper form for filing, and indorse the last leaf with the name of the institution, your own name, the subject, and the date of the examination.