University of the State of New York.

36TH ACADEMIC EXAMINATION.

PLANE TRIGONOMETRY.

THURSDAY, Jan. 23, 1890—Time, 9:30 A. M. to 12:30 P. M., only.

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36 *credits, necessary to pass,* 27.

1. Explain the difference between the characteristic and mantissa of the logarithm of a whole number and that of a decimal fraction 4

2. The logarithm of 199 is 2.298853. Find the logarithm of the fourth power of 199, and also of its cube root and state the principles employed 4

3. Draw a figure of the fourth quadrant and upon it indicate the following functions of 300° ; sine, cosine, cotangent, secant ... 4

4. State and demonstrate the theorem employed in computing the remaining angles of a triangle when two sides and the included angle are given 4

5. Given the versed sine $= \frac{3}{5}$, find the values of the sine, cosine, and tangent 3

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

7. Assuming the value of the functions of the sum and of the difference of two arcs, prove that :

(*a*) $\cos \frac{1}{2} a = \pm \sqrt{\frac{1 + \cos a}{2}}$ 2

(*b*) $\sin p - \sin q = 2 \sin \frac{1}{2}(p - q) \cos \frac{1}{2}(p + q)$ 2

8. In a right-angled triangle given the hypothenuse and an acute angle ; state the formulæ for finding the remaining parts 3

9. Explain, by means of a diagram, what measurements and what computations are necessary to determine, trigonometrically, the distance between two inaccessible objects, both of which can be seen from no one point 6