The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

PLANE TRIGONOMETRY

Thursday, January 22, 1920—1.15 to 4.15 p. m., only

Answer six questions. Papers entitled to less than 75 credits will not be accepted.

1 *a* Prove $\frac{1-\sin A}{1+\sin A}=(\sec A-\tan A)^2$

b Prove without using the tables: $\frac{\sin 75^\circ+\sin 15^\circ}{\sin 75^\circ-\sin 15^\circ}=\sqrt{3}$

2 *a* Compute the value of $\sqrt[5]{\frac{(5.162)(0.0913)^2}{10.132}}$

b Solve for x: $\log\left(\frac{1}{x}\right)^2=3$

3 *a* Find the numerical values of the following:
$\cos 240^\circ$; $\cot 750^\circ$; $\sin(-225^\circ)$; $\tan 540^\circ$

b Why can the value of the sine of an angle never be greater than 1?

c Why is there no limit to the value of the tangent of an angle?

4 Solve for values less than 360° and check:
$\sin^2 x-\cos x=\frac{1}{4}$

5 In the triangle ABC, $a=22.531$, $b=34.645$, $C=43^\circ\,31'$. Find A, B and c.

6 Find the perimeter and the area of a regular decagon circumscribed about a circle whose radius is 12 units.

7 To find the height of an inaccessible object a horizontal base line CD, 250 feet long, is measured directly toward the foot A of the object AB; the angles of elevation $ADB=48^\circ\,20'$, and $ACB=38^\circ\,40'$. Find height AB.

8 A and B are 1 mile apart on a straight road and C is a distant object on the same horizontal plane. The angles ABC and BAC are observed to be 120° and 45° respectively. Show (without the use of tables) that the distance from A to C is approximately 3.346 miles.