The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

PLANE TRIGONOMETRY

Thursday, January 24, 1918—1.15 to 4.15 p. m., only

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

1 Given $A=74^\circ\ 28'$, $B=82^\circ\ 34'$, $a=477.4$ ft; find b and c correct to the nearest tenth of a foot.

2 Given $a=750$ ft, $b=400$ ft, $A=22^\circ\ 15'$; find c correct to the nearest tenth of a foot.

3 Prove that if $\frac{\cos A}{b}=\frac{\cos B}{a}$, the triangle is either an isosceles or a right triangle.

4 A circular piece of cardboard 12 inches in diameter is fixed flat on a table. Two pins are stuck in the table in line with a diameter and 3 inches from the edge of the cardboard, on opposite sides. A string is stretched on the table from one pin round the cardboard to the other pin. Find the length of the string and the portion of the circumference of the cardboard which is in contact with the string.

5 Solve the equation $4\cot 2x=\cot^2 x-\tan^2 x$ for all values of x between 0° and 360°. Check.

6 Two ships are 4 miles apart. The angular distance of the first ship from a hostile warship, as observed by the second ship, is $52^\circ\ 20'$; the angular distance of the second ship from the hostile warship, as observed by the first ship, is $63^\circ\ 10'$. Find the distance of each ship from the hostile warship.

7 Two forces, one of 350 pounds and the other of 275 pounds, make an angle of $48^\circ\ 30'$. Find the intensity and the direction of their resultant. [The resultant is represented by the longer diagonal of the parallelogram whose sides are 350 and 275, the included angle being $48^\circ\ 30'$.]

8 A regular pentagon is inscribed in a circle whose radius is 16 inches; find the length of each side.