The University of the State of New York

216TH HIGH SCHOOL EXAMINATION

TRIGONOMETRY

Thursday, January 25, 1917—1.15 to 4.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in trigonometry.

The minimum time requirement for plane trigonometry is two recitations a week for a school year; for plane and spheric trigonometry three recitations a week for a school year.

Students taking this examination may use textbooks and notes prepared previous to the examination, but there must be no communication among students after the examination has begun.

Candidates for plane trigonometry should answer five questions from group I.

Candidates for plane and spheric trigonometry should answer five questions, selecting three from group I and two from group II. To receive credit for plane and spheric trigonometry, a candidate must secure at least 24 credits from group II.

Group I

1 Given $B = 52° 45'$, $C = 60° 30'$, $a = 125.3$ ft; find A correct to the nearest minute and b correct to the nearest tenth of a foot.

2 Given $a = 231.4$ ft, $b = 326.5$ ft, $C = 125° 10'$; find c correct to the nearest tenth of a foot. Check.

3 Solve the equation $\cos 2x = \cos x + \sin x$ for values of x between 0 and 360. Check.

4 Prove the identity $\tan\left(45° + \dfrac{A}{2}\right) = \dfrac{1 + \sin A}{\cos A}$

5 *a* The captain of a ship observed a lighthouse directly to the east; after sailing north 5 miles, he observed the lighthouse lying S. 50° 30' E. How far was the ship from the lighthouse at the time of the second observation?

b By the use of logarithms find the value of
$$\frac{(42.3)^3 \times 0.0135}{\sqrt[3]{136.7}}$$

6 A public park in the form of a triangle measures on its three sides 324.2 ft, 256.3 ft and 115.4 ft respectively; find the angle in which the streets intersect opposite the longest side of the park.

7 It is desired to find the hight of the top of a flagpole F placed over the center of a large building. C is an inaccessible point directly below F and on the same level with A where the first observation is taken. At A the angle of elevation of F is found to be 54° 28'. From A a distance $AB = 300$ ft is measured along the sidewalk and the angle BAC is found to be 42° 50'. At B another observation shows the horizontal angle between A and F to be 16° 45'. Find FC, that is, the hight of F above the level of A.

Group II

8 In a right spheric triangle, given $b = 120° 40'$, $A = 65° 30'$; solve the triangle.

9 In an oblique spheric triangle, given $a = 110° 5'$, $b = 115° 15'$, $c = 70° 12'$; find A.