The University of the State of New York

213TH HIGH SCHOOL EXAMINATION

TRIGONOMETRY

Tuesday, June 15, 1915—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.

To receive credit for plane trigonometry students should answer group I and group II.

To receive credit for both plane and spheric trigonometry students should answer group I and group III.

Group I

1 Given $a = 143.67$, $b = 176.2$, $c = 100.4$; find A, B and C.

2 (*a*) If $\sin 24^\circ = k$, find in terms of k the value of *each* of the following: (1) $\sin 156^\circ$, (2) $\tan 204^\circ$, (3) $\cos 114^\circ$, (4) $\cot 336^\circ$

(*b*) Show by geometry that the radian is less than 60°.

3 A straight flagstaff, leaning due north, is found to subtend an angle of 20° 51′ at a point in the plane on which it stands, 128 feet north of the base; at a point 73 feet south of the base, the flagstaff subtends an angle of 31° 14′. Find the hight of the tip of the staff above the ground.

Group II

4 By means of logarithms find the value of the following:

$$\sqrt[3]{\frac{(-56.13)^2 \times (-0.002643)^{\frac{1}{3}}}{(-94280)^{\frac{1}{5}} \times (-\pi)^3}}$$

5 (*a*) If $\tan 2x = -\frac{4}{3}$, and $0^\circ < x < 180^\circ$, find $\sin x$ and $\cos x$

(*b*) If $\tan A = \frac{1}{3}$ and $\tan B = \frac{1}{7}$, find $\tan (2A + B)$

6 Solve for positive angles less than 360°

$2 \sin x + 3 \cos x = 2$

Group III

7 (*a*) $2y = (2.718)^x + (2.718)^{-x}$; find y when $x = 0$; when $x = 2.5$

(*b*) Find the value of $\log_2 \sqrt{8} + \log_3 (\frac{1}{3})^2 - 4^{\log_4 7}$

8 Given $B = 125^\circ\ 40'$, $C = 90^\circ$, $a = 122^\circ\ 5'$; find A and b.

9 Given $a = 100^\circ\ 5'$, $b = 49^\circ\ 59'$, $c = 60^\circ\ 6'$; find A, B and C.