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 $60^\circ$.
3 A straight flagstaff, leaning due north, is found to subtend an angle of $20^\circ 51'$ at a point in the plane on which it stands, 138 feet north of the base; at a point 73 feet south of the base, the flagstaff subtends an angle of $31^\circ 14'$. Find the height of the tip of the staff above the ground.

Group II

4 By means of logarithms find the value of the following:
\[
\sqrt[3]{(-56.13)^2 \times (-0.002643)^{\frac{1}{3}}}
\]
\[
(-94280)^{\frac{1}{3}} \times (-\pi)^3
\]
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 $\tan B = \frac{1}{4}$, find $\tan (2A + B)$
6 Solve for positive angles less than $360^\circ$
\[
2 \sin x + 3 \cos x = 2
\]

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 $C$. 