1921 HIGH SCHOOL EXAMINATION

TRIGONOMETRY

Tuesday, June 18, 1907—9.15 a. m. to 12.15 p. m., only

For plane trigonometry answer eight questions. For plane and spheric trigonometry answer eight questions, selecting three from group III.
A, B and C represent the angles of a triangle. a, b and c the opposite sides. In a right triangle C represents the right angle.
Give special attention to arrangement of work.

Group I 1 Given $\tan x = \frac{3}{4}$ and x in the first quadrant; find the other functions of x.

2 Express the functions of the angle A in terms of the functions of $(90°-A)$; also in terms of $(180°-A)$.

3 In a plane triangle prove that $a+b : a-b :: \tan \frac{1}{2}(A+B) : \tan \frac{1}{2}(A-B)$.

4 Derive the sin $(45°+x)$ and cos $(45°-x)$.

Group II 5 The hight of a building subtends a right angle at an opposite window, the top being 60° above a horizontal straight line from the window; find the hight of the building, assuming the width of the street to be 50 feet.

6 A and B are on opposite sides of a river. A line AC is measured 3471 ft. and the angles BAC and ACB are found to be 60° 19′ and 48° 43′; find AB.

7 A, B and C are three towns; from A to B is 13 miles; from B to C 11 miles; from C to A 8 miles. Find the angle made by straight roads leading from C to A and from C to B.

8 Given log 2 = .301030, log 3 = .477121, log 5 = .698970. Without the tables find $\log \frac{9}{40}$; $\log 60\sqrt{6}$; $\log \sqrt[3]{.2}$; $\log \frac{1}{12}$

Group III 9 Prove that in any right spheric triangle $\cos c = \cos a \cos b$.

10 Solve the spheric triangle ACB in which $C=90°$, $a=76°\ 48'$, $A=82°\ 36'$.

11 Solve the oblique spheric triangle ABC, given $b=76°\ 30'$, $c=47°\ 20'$, $A=92°\ 30'$.

12 The latitude of New York is 40° 43′ N, longitude 74° W; the latitude of San Francisco is 37° 48′ N, longitude 122° 28′ W; find the distance in geographic miles on the shortest route between them. [A geographic mile = 1′ of longitude on the equator.]