High School Department

178TH EXAMINATION

TRIGONOMETRY

Thursday, June 18, 1903—9.15 a. m. to 12.15 p. m., only

Answer eight questions but no more. *Include at least three from the third division if credit is desired for both plane and spheric trigonometry. If more than eight are answered only the first eight answers will be considered. 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. Each complete answer will receive* 12½ *credits. Papers entitled to 75 or more credits will be accepted.*

Give special attention to arrangement of work.

First division

1 Give in terms of functions of a the sine, cosine, tangent, cotangent, secant and cosecant of $180°+a$ and of $180°-a$. [Arrange in tabular form and give algebraic signs.]

2 Given in a right triangle $\sin A=\frac{7}{25}$; express as common fractions *five* other functions of A.

3 Show that the mantissa of the logarithm of any set of figures is independent of the position of the decimal point. Given log 2.4=0.380211; write the logarithm of 2400 and of .000024.

4 Explain by aid of a diagram the force of the algebraic sign of each of *six* functions of an angle in the second quadrant.

Second division

5 Given in a right triangle $a=236$ feet, $B=43°\ 25'$; find A, b and c.

6 In a plane triangle $A=26°$, $B=122°$, $c=78$ feet; find a and b.

7 The sides of a plane triangle are 35 feet, 44 feet and 63 feet respectively; find the three angles of the triangle.

8 Indicate the measurements to be taken and the computations to be made by an observer on a level plain, to determine the hight of a visible but inaccessible mountain peak and its horizontal distance from him. [Give diagram and all formulas needed.]

Third division

9 Assuming the formula for the value of $\cos a$, prove that in any spheric triangle $\cos A=\sin B \sin C \cos a-\cos B \cos C$.

10 In a right spheric triangle $A=106°\ 34'$, $B=33°\ 11'$; find a, b and c.

11 In an oblique spheric triangle $A=104°\ 30'$, $B=62°\ 52'$, $c=56°\ 6'$; find a.

12 Find the distance in miles, measured on a parallel of latitude, between Richmond 77° 27′ west longitude and San Francisco 122° 25′ west longitude, both cities being 37° 40′ north latitude. [Assume the radius of the earth to be 4000 miles.]