

High School Department

182D EXAMINATION

TRIGONOMETRY

Thursday, June 16, 1904—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. Division of groups is not allowed. 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 Define cologarithm, trigonometric function, inverse function, negative angle, characteristic of a logarithm.

2 Express in terms of cosine x , the value of each of the following: $\sin \frac{1}{2} x$, $\cos \frac{1}{2} x$, $\tan \frac{1}{2} x$, $\sec \frac{1}{2} x$.

3 Derive the formula for the value of $\tan (x+y)$ expressed in terms of $\tan x$ and $\tan y$.

4 Derive the numeric values of sine, tangent, cosine and secant of 30° .

Second division 5 Show how to solve a triangle when two sides and the included angle are given. Give all the formulas necessary to be used.

6-7 The three sides of a plane triangle are 245.76 feet, 183.28 feet, and 121.32 feet; find the three angles.

8 In a right triangle $A=52^\circ$, $a=175$ feet; find b and c .

Third division 9 Define polar triangle. State and prove the relation existing between a spheric triangle and its polar triangle.

10 In a right spheric triangle $b=15^\circ$, $c=148^\circ 30'$; find a .

11 The sides of a spheric triangle are each $54^\circ 30'$; find an angle of the triangle.

12 Show how to determine the latitude of a place when the altitude and declination of the sun and the time of day are given.