

High School Department

176TH EXAMINATION

TRIGONOMETRY

Thursday, January 29, 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 $12\frac{1}{2}$ credits. Papers entitled to 75 or more credits will be accepted.

Give special attention to arrangement of work.

First division 1 The three sides of a triangle are 11 feet, 7 feet and 6 feet respectively; write the algebraic sign of each of six functions of the largest angle.

2 Using the table of logarithms of numbers but not the other tables, find to three decimal places $\sin 22^\circ 30'$, $\cos 22^\circ 30'$ and $\tan 22^\circ 30'$.

3 Write six independent formulas each expressing the value of one function of an angle in terms of one other function of the same angle.

4 Find the ratio of m to n when (a) $\log m + \log \frac{1}{n} = 0$, (b) $\log m - \log n = 3$. Find the value of x and of y when $\log x + \log y = 5$, $\log x - \log y = -1$

Second division 5 Given $A=73^\circ 24'$, $b=180$ feet, $c=325$ feet; find B , C and a .

6 Prove that in any plane triangle $\frac{a+b}{a-b} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)}$

7 In a plane triangle the interior angle A is $28^\circ 30'$ and the side b is 85 feet; find the numeric limits of the side a , so that there may be (a) one solution, (b) two solutions, (c) no solution.

8 In a plane triangle $a=256$ feet, $b=238$ feet, $c=124$ feet; find A , B and C .

Third division 9 Prove that the hypotenuse of a right spheric triangle is (a) less than 90° if the two legs are in the same quadrant, (b) greater than 90° if the legs are in different quadrants.

10 Given in a right spheric triangle $b=155^\circ 25'$, $a=29^\circ 40'$; find c , A and B .

11 Given in an oblique spheric triangle $A=50^\circ 10'$, $B=58^\circ 8'$, $a=62^\circ 40'$; find two possible values for each of the other parts.

12 Find the distance on the arc of a great circle from New York city, latitude $40^\circ 43'$ north, longitude 74° west, to Mexico, latitude $19^\circ 25'$ north, longitude $99^\circ 5'$ west.