

191ST HIGH SCHOOL EXAMINATION

TRIGONOMETRY

Tuesday, January 22, 1907—9.15 a. m. to 12.15 p. m., only

Answer eight questions. Include at least three from the third division if credit is desired for both plane and spheric trigonometry. 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 if written by students in class A; those entitled to 60 or more credits will be accepted if written by students in class B.

Give special attention to arrangement of work.

First division 1 Compute the numeric value of $2x \sin A - 3x^2 \cos A$, when $x=260$ and $A=135^\circ$. Use logarithmic tables.

2 Without using the tables, find the numeric values of sine, cosine, tangent and cotangent of 120° , and give to each its proper algebraic sign.

3 Prove that $\tan 30^\circ \tan 60^\circ = \tan 45^\circ$

4 Prove that in any plane triangle $a^2 = b^2 + c^2 - 2bc \cos A$

Second division 5 The side of a regular decagon is 12 feet; find the radius of the circumscribed circle.

6 Given $a=37.5$, $b=48.4$, $C=110^\circ$; find A , B and c .

7 In a circle whose radius is 15 feet find the length of a chord subtending an arc of 54° , and the area of the segment bounded by this arc and chord.

8 Write a suitable formula for finding an angle of a triangle when the three sides are given (1) by the use of natural numbers, (2) by the use of logarithms. Give your reasons for the selection of each formula given.

Third division 9 Write the formula for the cosine of (1) one half an angle of a spheric triangle in terms of the sides of the triangle, (2) one half a side in terms of the angles.

10 Two places on the fortieth parallel north latitude are 60° apart in longitude; find in miles their distance apart measured on (1) the arc of a great circle, (2) the fortieth parallel.

11 Given $a=73^\circ 50'$, $b=120^\circ 45'$, $A=88^\circ 52'$; find B .

12 Given $a=50^\circ$, $b=108^\circ$, $c=83^\circ$; find A .