High School Department

159TH EXAMINATION

PLANE TRIGONOMETRY

Thursday, June 15, 1899—9.15 a. m. to 12.15 p. m., only

Answer 10 questions but no more. *If more than 10 are answered only the first 10 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, S the area. In a right triangle C represents the right angle and c the hypotenuse. Each complete answer will receive 10 credits. Papers entitled to 75 or more credits will be accepted.*

1 If the radius of a circle is 8 inches, find the number of degrees in an arc of 6 inches.

2 Express as a function of an angle of 20° *each* of the following: csc 70°, ctn 110°, sin 340°, sec 200°, cos 250°.

3 Given $\cos A = -\frac{15}{17}$ and A in the third quadrant; find the value and sign of *five* other functions of A.

4 Trace the variation in the value of sin A and of sec A as A increases from 0° to 360°.

5–6 Show by diagram the line values of *five* trigonometric functions of an angle of 150°, and find the algebraic sign and numeric value of each function.

7 Prove $\cos 2A = \cos^2 A - \sin^2 A$.

8 Prove that the sides of a triangle are proportional to the sines of the opposite angles.

9 Prove $\tan x - \operatorname{ctn} x = \frac{1 - 2\cos^2 x}{\sin x \cos x}$

10 Given $\tan A + \operatorname{ctn} A = 2$; find A.

11 Given $x = \sqrt[5]{\frac{382 \times 7.13}{25.5 \times .919}}$; $y = \left(\frac{17.3 \times 4.16}{63.95}\right)^{18}$. Find x and y by use of the table of logarithms.

12 In a right triangle, given $A = 36° 45'$, $b = 17.58$; find the perimeter and the area of the triangle.

13 In a triangular field one side, 80 rods long, makes with the adjacent sides angles of 66° 30′ and 81° 50′; find the area of the field.

14–15 From a window on a level with the base of a flagstaff the angle of elevation of the top of the flagstaff is 52° 20′; from another window, 20 feet vertically above the first, the angle of elevation is 44° 35′. Find the hight of the flagstaff and the distance of its base from the lower window.