

High School Department

181ST EXAMINATION

PLANE GEOMETRY

Wednesday, March 23, 1904—9.15 a. m. to 12.15 p. m., only

Answer eight questions but no more, including at least one from each of the three divisions. If more than eight are answered only the first eight answers will be considered. Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.

First division 1 Define five of the following: axiom, problem, hypothesis, scalene triangle, segment, circumscribed polygon, locus of a point.

2 Write three theorems that conclude "the two straight lines are parallel." Demonstrate one of these theorems.

3 Complete and demonstrate the following: the sum of the three angles of a triangle is equal to . . .

4 Complete each of the following theorems and demonstrate one of them: (a) if two circles intersect each other . . . , (b) if two circles are tangent to each other . . .

5 Prove that the homologous altitudes of two similar triangles have the same ratio as any two homologous sides.

Second division 6 Chords drawn from a point in a circumference to the extremities of a diameter are respectively 10 inches and $13\frac{1}{2}$ inches; find the diameter and the distance of the point from the diameter.

7 From a point within an equilateral triangle the perpendiculars to the sides are respectively 2 inches, 3 inches and 5 inches; find the area of the triangle.

8 The area of a sector is 18π , the angle of the sector is 80° ; find the radius of the sector.

9 The base of a triangle is 15 feet, its area 60 square feet; find the area of a similar triangle whose altitude is 6 feet.

10 A leg of an isosceles trapezoid is 13 inches and its projection on the longer base is 5 inches; the longer base is 17 inches. Find the area of the trapezoid.

Third division 11 Show how to construct a right triangle having given one leg and the altitude on the hypotenuse.

12 Show how to bisect an angle formed by two converging lines without producing the lines till they meet.

13 Write the formula for the area of any triangle in terms of its sides and from this formula derive the formula for the area of an equilateral triangle in terms of one side.

14 Prove that the lines joining the middle points of the sides of a triangle divide the triangle into four equal triangles.

15 Prove that lines from the center of a circle to the ends of a leg of the circumscribed trapezoid form a right angle.

... professional law, medical, dental, veterinary, navy and
examinations. After the first edition of the 1898 examination
academic and professional papers were separated.