164th EXAMINATION

PLANE GEOMETRY

Wednesday, June 13, 1900 — 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. Ar-
range work logically. Each complete answer will receive 12½ credits.
Papers entitled to 75 or more credits will be accepted.*

**First
division**

1 Define *rhombus, corollary, diagonal, radius, chord.*

2 Complete and demonstrate the following: the sum of
the interior angles of any polygon is equal to . . .

3 Complete and demonstrate the following: an angle formed
by a tangent and a chord meeting it at the point of contact is
measured by . . .

4 Prove that triangles which have their corresponding sides
proportional are similar.

5 Prove that the circumference of a circle may be circum-
scribed about any regular polygon.

**Second
division**

6 Find the perimeter of an equilateral triangle whose
area is 64 square feet.

7 The perpendicular from the vertex of a right triangle to
the hypotenuse is 12 feet and the greater segment of the hy-
potenuse is 16 feet; find the length of each side of the triangle.

8 ABC is a triangle; D is the middle point of AC; $AB = 7$
feet, $AD = 6$ feet and $BD = 4\frac{1}{4}$ feet; find BC.

9 The angle between two tangents to a circle is 60° and the
length of the chord joining the points of contact is 8.66 feet;
find the radius of the circle.

10 A rectangle whose base is twice its altitude is inscribed in
a circle whose radius is 5 feet; find the area of the rectangle.

**Third
division**

11 Two circles intersect in the points A and B; from
any point on the line AB produced tangents are drawn to
the given circles; prove that these tangents are equal.

12 AB and CD are two lines intersecting at E; P is a point
in the angle CEB; through P draw two lines each of which
shall make equal angles with AB and CD. Give proof.

13 Given the middle points of the three sides of a triangle;
show how to construct the triangle.

14 Given a line a; construct a line x so that $x = a\sqrt{2}$.

15 Show, by applying the construction in 14, how to divide a
given triangle into two equal parts by a line parallel to one of
its sides.