PLANE GEOMETRY

Tuesday, September 10, 1918—9.15 a.m. to 12.15 p.m., only

Answer eight questions. Papers entitled to less than 75 credits will not be accepted.

1 Prove that if one side of a triangle is greater than a second side, the angle opposite the first side is greater than the angle opposite the second side.

2 Prove that an angle formed by two secants meeting without the circle is measured by one half the difference of the intercepted arcs.

3 Prove that the bisector of an angle of a triangle divides the opposite side into segments proportional to the adjacent sides.

4 Prove that the areas of two similar triangles are to each other as the squares of any two corresponding sides.

5 Prove that the lines which join the mid points of the sides of a rhombus form a rectangle.

6 Prove that the sum of the legs of a right triangle equals the sum of the hypotenuse and the diameter of the inscribed circle.

7 In a triangle whose base is 24 and whose altitude is 18 the altitude is bisected by a line parallel to the base; find the area of the triangle cut off.

What part of the altitude must be cut off in order that the area of the triangle may be bisected?

8 The sum of the areas of two circles is 20 and the difference of their areas is 15; find their radii.

9 Taking any line as 1, construct a line equal to \( \sqrt{2} \), and also one equal to \( \sqrt{6} \).

10 Construct a circle which shall touch a given line \( AB \) at \( P \) and pass through a given point \( C \) outside the line.

11 The diameter of a bicycle wheel is 28 inches; how many revolutions does the wheel make in going 10 miles?