PART II.

Section 1:—

(*a*) The sum of the angles of a triangle is equal to two right angles.

If the sides of a convex polygon are produced in order, the sum of the exterior angles so formed is equal to four right angles.

If two sides of a triangle are equal, the angles opposite those sides are equal; and the converse.

If two triangles have two sides of the one equal to two sides of the other, each to each, and the angles opposite to one pair of equal sides are right angles, the triangles are congruent.

(NOTE.—The ambiguous case should be discussed.)

If two sides of a triangle are unequal, the greater side has the greater angle opposite to it; and the converse.

Of all straight lines that can be drawn to a given straight line from a given point outside it, the perpendicular is the shortest.

The opposite angles of a parallelogram are equal; and the converse.

The opposite sides of a parallelogram are equal and each diagonal bisects the parallelogram; and the converse of the first part.

The diagonals of a parallelogram bisect one another; and the converse.

If a pair of opposite sides of a quadrilateral are equal and parallel, it is a parallelogram.

The straight line drawn through the middle point of one side of a triangle parallel to another side bisects the third side.

The straight line joining the middle points of two sides of a triangle is parallel to the third side and equal to one-half of it.

If three or more parallel straight lines make equal intercepts on any transversal, they make equal intercepts on any other transversal.

(*b*) To bisect a given angle.

To bisect a given straight line.

To construct a perpendicular to a given straight line (i) from a given point in the line, (ii) from a given point outside the line.

To construct an angle equal to a given angle.

To draw a straight line parallel to a given straight line.

(*c*) To divide a straight line into any number of equal parts or in a given ratio.

The construction of angles of 60°, 45°, 30°.

The construction of triangles and quadrilaterals from sufficient data and the solution of triangles by drawing to scale.

Section 2:—

(*a*) The area of a parallelogram is equal to the area of a rectangle on the same base and between the same parallels; and is therefore measured by the product of the measures of its base and its altitude.

Parallelograms on the same or equal bases and of the same altitude are equal in area.

The area of a triangle is equal to one-half of the area of a rectangle on the same base and between the same parallels; and is therefore measured by one-half of the product of the measures of its base and its altitude.

Triangles on the same or equal bases and of the same altitude are equal in area.

Equal triangles on the same or equal bases are of the same altitude.

The square of the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides; and the converse.

Geometrical proofs of the following algebraic identities:—

$$k(a + b + c) = ka + kb + kc$$
$$(a + b)^2 = a^2 + 2ab + b^2$$
$$(a - b)^2 = a^2 - 2ab + b^2$$
$$a^2 - b^2 = (a + b)(a - b).$$

(*b*) To construct a triangle equal in area to a given quadrilateral.

To construct a rectangle equal in area to a given triangle.

(*c*) The determination by measurement of the areas of plane rectilineal figures.

The experimental proof of the theorem of Pythagoras.

Section 3:—

(*a*) The locus of points equidistant from two fixed points is the perpendicular bisector of the line joining the two fixed points.

The locus of points equidistant from two intersecting straight lines consists of the pair of straight lines which bisect the angles between the two given lines.

(*b*) The construction or plotting of the loci of points subject to simple geometrical conditions.