AN ROINN OIDEACHAIS

(Department of Education.)

INTERMEDIATE CERTIFICATE EXAMINATION, 1946

ELEMENTARY MATHEMATICS (Geometry).

FOR GIRLS ONLY.

THURSDAY, 13*th* *JUNE*—Afternoon, 3 to 5.

Six questions may be answered.

All questions carry equal marks.

1. P is any point on a line XY. By using a ruler and compass only, show how you would draw a line through P perpendicular to XY.

Give proof.

2. If the side of a triangle is produced, show that the exterior angle is equal to the sum of the two interior and opposite angles.

O is any point within a triangle ABC. Prove that

$$B\hat{O}C = B\hat{A}C + A\hat{B}O + A\hat{C}O.$$

3. Construct a quadrilateral ABCD having AB=3·8″, AC=CB=3·2″, AD=DC=2·1″. Then construct a triangle equal in area to the quadrilateral. [No proof required.]

4. Prove that the angles at the circumference standing on the same arc of a circle are equal to one another.

LM is any chord of a circle and A and B are points on the same side of LM. A is outside the circle and B is on the circumference of the circle. Prove that the angle LBM is greater than the angle LAM.

5. (*a*) What is the locus of a point which moves at a given distance from a given point ? (*b*) What is the locus of a point which is equidistant from two given intersecting straight lines ?

Draw two straight lines intersecting at O at an angle of 60°. Find, by construction, all the points which are equidistant from the lines and which are at the same time one inch from the point O.

6. ABC is a triangle. Show, with proof, how a circle may be drawn through A, B and C.

O is the centre of the circumscribed circle of a triangle PQR and OL is the perpendicular from O to PQ. Show that $\hat{LOQ}$ is equal to $\hat{PRQ}$.

7. Prove that the opposite angles of a cyclic quadrilateral are supplementary. State the converse theorem.

8. What is a tangent to a circle ?

Show how to draw tangents to a circle from an external point and show that they are equal.

9. Prove that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides.