

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1955.

MATHEMATICS—GEOMETRY.

FRIDAY, 10th JUNE.—MORNING, 10 TO 12.30

The total number of questions answered should not exceed *six*.

Mathematical Tables may be obtained from the Superintendent.

1. Show (a) how to circumscribe a circle about a given triangle, (b) how to inscribe a circle in a given triangle. Give proof in each case.
[30 marks.]

2. If two sides of a triangle are equal, prove that the angles opposite these sides are equal.

In a triangle ABC , $AB=AC$. Through C a straight line is drawn parallel to AB and meeting the bisector of the angle BAC in D . Prove that BC bisects the angle ACD and the line AD .

[30 marks.]

3. Construct a quadrilateral $ABCD$ so that $AB=5$ inches, $BC=3$ inches, $CD=2$ inches, and $DA=DB=4$ inches.

Then construct (a) a triangle, (b) a rectangle, (c) a square, equal in area to the quadrilateral.

[No proof is required but construction lines should be clearly shown.]

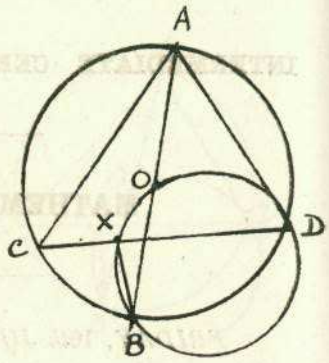
[30 marks.]

4. In an obtuse-angled triangle, prove that the square on the side subtending the obtuse angle is equal to the sum of the squares on the sides about the obtuse angle together with twice the rectangle contained by one of those sides and the projection of the other side upon it.

In a triangle ABC , $BC=3$ inches, $CA=5$ inches, and the angle $BCA=120^\circ$; calculate the length of AB .

[35 marks.]

5. Prove that the angle subtended by an arc of a circle at the centre is double the angle subtended by it at the circumference.



As shown in the diagram, AB is a diameter of a circle, centre O, and AD, AC are chords. The circle ODB meets CD in X. Prove that $CX = XB$.

[35 marks.]

6. If two triangles are equiangular, prove that their corresponding sides are proportional.

AB is a diameter of a given circle. The tangent at B meets a chord AC, produced, at D. Prove that the rectangle AC.AD is constant.

If $AB = 5$ inches, and $AC = 4$ inches, find the length of the tangent DB.

[35 marks.]

7. The two sides of a canal are straight and are parallel to one another. A and B are two marks, 100 yards apart, on one bank, and C is a mark on the other bank. If the angle $CAB = 25^\circ$, and the angle $ABC = 38^\circ$, calculate, as accurately as the Tables allow, the width of the canal.

[35 marks.]