

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1954.

MATHEMATICS—GEOMETRY.

FRIDAY, 11th 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. Prove that the three angles of a triangle are together equal to two right angles.

Prove that the angles of a pentagon are together equal to six right angles.

[30 marks.]

2. Show, without proof, (i) how to draw a tangent to a given circle from a given point outside it; (ii) how to construct a square equal in area to a given rectangle.

[30 marks.]

3. Using ruler and compass only, construct a quadrilateral, ABCD, so that $AC=2$ inches, $CD=3$ inches, $\angle ACB=60^\circ$, $\angle BAC=45^\circ$ and $\angle DAC=90^\circ$.

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

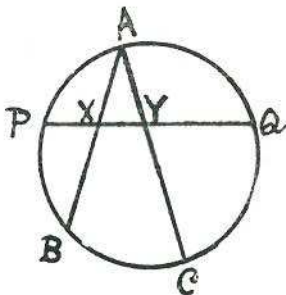
[30 marks.]

4. Prove that the medians of a triangle are concurrent and that they divide each other in the ratio 2 : 1.

[35 marks.]

5. Prove that equal chords of a circle subtend equal angles at the circumference.

As shown in the diagram, AB, AC, P, Q, are the middle points of the arcs AB, AC, and PQ cuts AB and AC at X and Y.



Prove that $AX=AY$.

[35 marks.]

6. In a triangle ABC, the angle ABC is a right angle, and AB, BC are 3 inches and 4 inches long, respectively. D is the foot of the perpendicular from B to AC, and the bisector of $\angle ABC$ meets AC in O. Find the lengths of BD and OA, and show that $\tan \angle OBD = \frac{1}{4}$. [35 marks.]

7 (a) Without using tables, construct an angle A, such that $\sin A = \frac{1}{4}$. Measure the angle.

(b) A man is walking on a horizontal plane towards a vertical pole standing on the plane. When he is 50 yards from the pole he observes that the angle of elevation of the top of the pole is 11° . How far is he from the pole when he observes that the angle of elevation is 20° ? [35 marks.]