

AN ROINN OIDEACHAIS
(Department of Education.)

INTERMEDIATE CERTIFICATE EXAMINATION, 1944.

ELEMENTARY MATHEMATICS (Geometry).
FOR GIRLS ONLY.

TUESDAY, 13th JUNE.—AFTERNOON, 3 TO 4.30.

Six questions may be answered.

All questions carry equal marks.

Mathematical Tables may be obtained from the Superintendent.

1. P is a point outside a straight line LM. Using ruler and compass only, show how to find a point Q on LM such that PQ and LM may be perpendicular to each other.

Give proof.

2. ABC is a triangle. The bisectors of the angles ABC and ACB meet at O. Through O a line XOY is drawn parallel to BC meeting AB at X and meeting AC at Y. Prove that $XY = XB + YC$.

3. ABC is a triangle. Prove that $AB + BC$ is greater than AC.

If $AB = 8$ ins., $BC = 5$ ins., between what limits must the length of AC lie?

4. Construct accurately a triangle ABC so that $AB = 2.4$ ins., $BC = 1.8$ ins., $CA = 3.5$ ins. Draw a circle which shall pass through A, B, C and measure the length of its radius.

[Proof need not be given but every step of your construction should be clearly shown.]

5. What is the locus of a point which moves so that its distance from a given straight line may be always one inch ?

Two straight lines, MON , XOY intersect at an angle of 80° . Find four points such that each of them may be one inch from MON and 1.5 inches from XOY .

Measure the distance from O to each of those points.

[Use your *protractor* to construct the angle of 80° .]

6. If the sum of the squares on two sides of a triangle be equal to the square on the third side the triangle is right-angled. Give proof.

7. Through a point on the circumference of a circle a chord and a tangent are drawn. Prove that the angles between those two lines are equal to the angles in the alternate segments of the circle.

8. ABC is a triangle. Through A a line XAY is drawn parallel to BC . Through A, B, C lines AD, BE, CF are drawn perpendicular to XY : AD meets BC at D and BE, CF meet XY at E, F respectively. Prove that the area of $BEFC$ is double the area of ABC ,

(i) when the angles ABC and ACB are *both acute* ;

(ii) when the angle ACB is *obtuse*.

9. If a side of a cyclic quadrilateral be produced the exterior angle is equal to the interior opposite angle. Give proof.

A triangle ABC is inscribed in a circle. Perpendiculars AD, BE are drawn from A and B to BC, AC respectively. AD meets BE at O and on being produced, AD meets the circle again at G . Prove that $BO=BG$.