AN ROINN OIDEACHAIS

(Department of Education.)

INTERMEDIATE CERTIFICATE EXAMINATION, 1942.

ELEMENTARY MATHEMATICS (Geometry).

FOR GIRLS ONLY.

WEDNESDAY, 10*th JUNE*.—MORNING, 10 TO 11.30.

Six questions may be answered.

All questions carry equal marks.

Mathematical Tables may be obtained from the Superintendent.

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1. Show, with proof, how to bisect an angle geometrically.

2. What is meant by an isosceles triangle ?

On opposite sides of BC as base two isosceles triangles ABC, DBC are constructed. Prove that AD bisects BC perpendicularly.

3. PQR is a triangle in which PQ is greater than PR : prove that the angle PRQ is greater than the angle PQR.

If S is any point in the side QR, prove that the angle PSQ is greater than the angle PQR.

4. On a line XY two points B, C are marked such that BC=3·6 ins. and a triangle ABC is constructed having BA=3·2 ins., CA=2 ins. Find (i) the locus of the points which are 1 inch from XY, (ii) all the points which are 3 ins. from A and 1 inch from XY.

5. Prove that the angle in a semi-circle is a right angle.

Two circles intersect at A and B. AC and AD are two diameters, one in each circle. Show that the points C, B, D are in one straight line.

6. PQR is a triangle and L is the mid-point of PQ. Through L a line is drawn parallel to QR and meeting PR at M. Prove that M is the mid-point of PR.

ABCD is a quadrilateral in which AB is parallel to DC. From E, the mid-point of AD, a line is drawn parallel to AB meeting BC at F. Prove that F is the mid-point of BC.

7. Prove that if the square on one side of a triangle is equal to the sum of the squares on the other two sides the triangle is right-angled.

The lengths, in inches, of the sides of four triangles are as follows : (i) 4, 7, 8 ; (ii) 5, 4, 3 ; (iii) 13, 12, 5 ; (iv) 11, 8, 7. Find whether any of those triangles are right-angled.

[Do not construct these triangles.]

8. Show how to draw a tangent to a circle from a point outside the circle. Prove your construction.

Calculate the length of the tangent drawn to a circle 2 ins. in radius from a point 5 ins. from the centre of the circle.

9. Construct accurately a quadrilateral ABCD such that AB=AC=4 ins., BC=$2\frac{1}{2}$ ins., AD=3 ins., $\angle$ADC=90°.

Construct geometrically a triangle equal in area to ABCD.

[Explain your construction fully.]