

INTERMEDIATE CERTIFICATE EXAMINATION, 1962.

MATHEMATICS—GEOMETRY.

FRIDAY, 8th 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. If one side of a triangle is greater than another, prove that the angle opposite the greater side is greater than the angle opposite the lesser side.

In a triangle ABC, AB is greater than AC and the internal bisectors of the angles ABC, ACB meet at O. Prove that OB is greater than OC.

(30 marks.)

2. Prove that the opposite sides of a parallelogram are equal.

If X, Y, Z are points on the sides of a triangle ABC such that XY is parallel to BC, XZ is parallel to AC and YZ is parallel to AB, prove that X, Y, Z are the mid-points of the sides.

(30 marks.)

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

(30 marks.)

4. Show, with proof, how to divide a given straight line into two parts such that the rectangle contained by the whole line and one part may be equal to the square on the other part.

(35 marks.)

5. Prove that the angles made by a tangent to a circle with a chord drawn through the point of contact are equal respectively to the angles in the alternate segments of the circle.

ABCD is a quadrilateral in which AB and DC are parallel. AC and BD intersect at O. Prove that the circles circumscribed about the triangles ABO, CDO, respectively, touch each other at O.

(35 marks.)

6. If two triangles have an angle of the one equal to an angle of the other and the sides about the equal angles are proportionals, prove that the triangles are similar.

Two straight lines PQ, RS intersect at O and $OP \cdot OS = OR \cdot OQ$. Prove that PR is parallel to SQ.

(35 marks.)

7. (i) The inscribed circle of a triangle ABC touches BC at D. If $BD = 5''$ and the radius of the circle is $2''$, find the size of the angle ABC.

(ii) A man sets out from O. He walks 100 yards in a direction 60° north of west and then 80 yards in a direction 60° south of west, reaching a point P. Find what direction P is from O, in degrees north of west, correct to the nearest degree.

(35 marks.)