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(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1953.

MATHEMATICS—GEOMETRY.

THURSDAY, 11*th JUNE*—Morning 10 to 12.30.

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

Mathematical Tables may be obtained from the Superintendent.

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1. Show how to trisect a given straight line geometrically. Give proof.

[30 marks.]

2. ABCD is a parallelogram and its diagonals, AC and BD, intersect at O. Prove AO=OC and BO=OD.

If any straight line through O meets a pair of opposite sides in X and Y, respectively, prove that XY is bisected at O.

[30 marks.]

3. Draw geometrical figures to illustrate the identities

   (i) $a(a+b)=a^2+ab$;

   (ii) $(a+b)(a-b)=a^2-b^2$. $[a>b]$.

Give a short explanation of your diagrams to show how they illustrate the identities.

[30 marks.]

4. Two chords of a circle intersect each other internally ; prove that the rectangles contained by their segments are equal.

[35 marks.]

5. The base BC of a triangle ABC is fixed. What is the locus of the vertex A, (i) when the area of ABC is constant, (ii) when the angle BAC is constant ?

The base BC of a triangle ABC is 8 cms. long, the area of the triangle is 20 square cms., and the vertical angle of the triangle is 60°. Construct the triangle, using ruler and compass only. Explain your construction.

[35 marks.]

6. The vertical angle of a triangle is bisected internally. Prove that the bisector divides the base in the ratio of the other two sides.

In a triangle ABC, AB=AC=2BC and BC is 2 inches long. Calculate the length of the radius of the inscribed circle of the triangle ABC.

[35 marks.]

7. Construct a triangle ABC so that $\cos A = \frac{3}{5}$, $\tan B = \frac{1}{3}$, and the perpendicular from A to BC is 1·2 inches.

Calculate the lengths of the sides of the triangle ABC.

[Protractor may not be used.]

[35 marks.]