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(Department of Education)

INTERMEDIATE CERTIFICATE EXAMINATION, 1960.

ELEMENTARY MATHEMATICS (Geometry).
FOR GIRLS ONLY.

FRIDAY, 10th JUNE.—MORNING, 10 TO 12.

All questions to be answered.

All questions carry equal marks.

1. Using ruler and compass only, construct a triangle ABC such that the base, BC, is 3 inches long, the angle ABC is 30° and the angle ACB is 75° .

[No proof is required but all construction lines must be shown clearly.]

2. (a) Prove that any two sides of a triangle are together greater than the third side.
(b) E is a point on the side AC of a triangle ABC. Prove that the sum of AB and AC is greater than the sum of BE and EC.
3. (a) What is the locus (i) of points which are equidistant from two fixed points A, B, (ii) of the centres of circles which touch a given straight line at a fixed point E in the line? (Illustrate your answer in each case by means of a diagram.)
(b) Show, with proof, how to construct on a given straight line a segment of a circle containing an angle equal to a given angle.
4. (a) Prove that the angle subtended at the centre by an arc of a circle is double the angle subtended by the arc at the circumference.
(b) A circle is circumscribed about a triangle ABC. The perpendicular from O, the centre of the circle, to the side BC is produced to meet the circumference at D. If the angle BAC is 40° , find the number of degrees in the angles BOD, BCD and ODC.
5. (a) Prove that a diagonal of a parallelogram bisects the parallelogram.
(b) ABCD is a parallelogram and E is the middle point of the diagonal DB. Any straight line is drawn through E meeting AB in F and DC in G. Prove that the area of the figure AFGD is half the area of the parallelogram.
6. Of any two chords of a circle prove that the greater chord is nearer to the centre than the less.

P is any point on a chord AB of a circle. Show, with proof, (i) how to draw through P a chord equal to AB, (ii) how to find the shortest chord through P.