INTERMEDIATE CERTIFICATE EXAMINATION, 1967

ELEMENTARY MATHEMATICS (GEOMETRY)

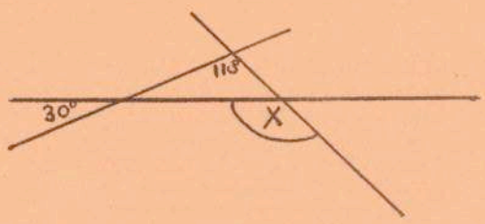
FOR GIRLS ONLY

TUESDAY, 13th JUNE - Morning, 10 to 12

All questions to be answered.

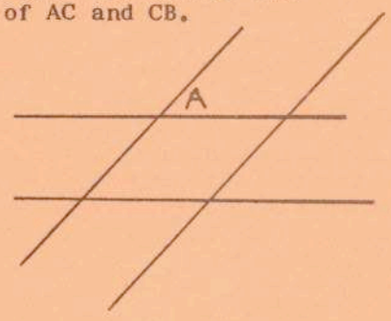
All questions carry equal marks.

1. (i) Three straight lines intersect as shown in the diagram. Two of the angles so formed are angles of 30° and 110° as shown. Find, without measurement, how many degrees there are in the angle marked X.



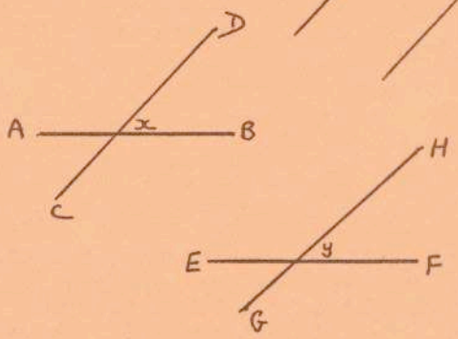
(ii) ABC is a triangle and P is a point on the side BC. Prove that the sum of the lengths of AP and PB is less than the sum of the lengths of AC and CB.

2. Draw two intersecting pairs of parallel lines and mark one of the angles with an A, as in diagram (i). Then mark with an X all the angles in your diagram which are equal to the angle A.



(i)

x is the acute angle between two straight lines AB and CD while y is the acute angle between two straight lines EF and GH. If AB is parallel to EF and CD parallel to GH, as in diagram (ii), prove $x = y$.



(ii)

3. Prove that a diagonal of a parallelogram bisects the parallelogram.

Hence prove that the area of a parallelogram is twice the area of any triangle on the same base and between the same parallels.

4. Prove that the perpendicular from the centre of a circle to a chord bisects the chord.

If three chords of a circle are parallel to one another, prove that their mid-points are collinear (i.e. in one straight line).

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

6. What is the locus of the points in a plane that are equidistant from a fixed point ?

Draw a diagram to indicate all the points in a plane that are at a distance of 3" from a fixed point A. If one of those points is B, indicate also all the points in the plane that are 3" from B.

Then mark in three points X, Y, Z, such that (i) X is less than 3" from A and less than 3" from B, (ii) Y is less than 3" from A and more than 3" from B, (iii) Z is more than 3" from A and more than 3" from B.