Six questions may be answered.
All questions carry equal marks.

1. P is any point on a line XY. By using a ruler and compass only, show how you would draw a line through P perpendicular to XY. Give proof.

2. If the side of a triangle is produced, show that the exterior angle is equal to the sum of the two interior and opposite angles.
O is any point within a triangle ABC. Prove that
\[ \angle BOC = \angle BAC + \angle ABO + \angle ACO. \]

3. Construct a quadrilateral ABCD having \( AB = 3\text{-}8", \ AC = CB = 3\text{-}2", \ AD = DC = 2\text{-}1" \). Then construct a triangle equal in area to the quadrilateral. [No proof required.]

4. Prove that the angles at the circumference standing on the same arc of a circle are equal to one another.
LM is any chord of a circle and A and B are points on the same side of LM. A is outside the circle and B is on the circumference of the circle. Prove that the angle LBM is greater than the angle LAM.

5. (a) What is the locus of a point which moves at a given distance from a given point? (b) What is the locus of a point which is equidistant from two given intersecting straight lines?
Draw two straight lines intersecting at O at an angle of 60°. Find, by construction, all the points which are equidistant from the lines and which are at the same time one inch from the point O.
6. ABC is a triangle. Show, with proof, how a circle may be drawn through A, B and C.
O is the centre of the circumscribed circle of a triangle PQR and OL is the perpendicular from O to PQ. Show that \( \angle LOQ \) is equal to \( \angle PRQ \).

7. Prove that the opposite angles of a cyclic quadrilateral are supplementary. State the converse theorem.

8. What is a tangent to a circle?
Show how to draw tangents to a circle from an external point and show that they are equal.

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