1. Show how to draw a straight line perpendicular to a given straight line, from a point outside it. Prove that the lines are perpendicular to each other.

2. What is a parallelogram ?

Construct a parallelogram of area 8 square inches, so that one side may be 4″ and another side $2\frac{1}{2}$″. Measure the diagonals.

3. Any two sides of a triangle are together greater than the third.

Use that knowledge to prove that the perimeter of a quadrilateral is greater than the sum of the diagonals.

4. Construct a geometrical figure to show that

$$(a+b)^2 \equiv a^2+2ab+b^2.$$

Explain the construction.

5. A ladder 40′ long stands against a vertical wall, making an angle of 70° with the ground. Its base is moved 10′ further away from the foot of the wall. Find by using an accurate diagram drawn to scale, how far up the wall the top of the ladder now reaches.

6. AB is the diameter of a circle whose centre is O, and C is a point on the circumference. Prove $\angle BOC = 2\angle BAC$ and show that the angle in a semicircle is a right angle.

If CO produced meets the circle at D, prove that DB is parallel to AC.

7. Show how to draw an equilateral triangle 2″ in height.

Explain the construction and find the area of the triangle.

8. What is the locus of a point which moves so as to be always equidistant from two intersecting straight lines?

Use this knowledge to find a point which is equidistant from each of three straight lines which intersect so as to form a triangle.

Inscribe a circle in the triangle.