2. (*a*) If two triangles have two sides of the one equal to two sides of the other, each to each, but the angle contained by the two sides of the one greater than the angle contained by the two sides of the other, the base of that which has the greater angle shall be greater than the base of the other.

(*b*) What restriction does Euclid make in his construction, and why?

3. The opposite sides and angles of a parallelogram are equal to one another and the diameter bisects it, that is, divides it into two equal parts.

4. To describe a parallelogram that shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

5. If a straight line be divided into any two parts, the rectangle contained by the whole and one of the parts is equal to the rectangle contained by the two parts together with the square on the aforesaid part.

6. If a straight line be divided into two equal, and also into two unequal parts, the squares on the two unequal parts are together double of the square on half the line, and of the square on the line between the points of section.

7. Through a given point draw a line, so that the parts of it, intercepted between that point and perpendiculars upon it from two other given points, may be equal to each other.

8. BCDF is a four-sided figure having the side BC parallel to the side FD. If BD and FC be joined by straight lines intersecting in K, shew that the lines BD and CF are together greater than the two lines BF and CD, also that the triangle CKD is equal to the triangle BKF.

9. ABCD is a rectangle, E any point in BC, and F any point in CD. If AF, AE and EF be joined, shew that the rectangle ABCD is equal to twice the triangle AEF, together with the rectangle EB, DF.

10. Produce one side of a scalene triangle so that the rectangle under it and the produced part may be equal to the difference of the squares on the other two sides.

Chemistry.

1. Describe the chief characters of (1) ammonia, (2) ammonium carbonate; and the process by which they are usually prepared. Give also the chemical re-actions which occur in these processes.

2. Describe fully the modes of decomposing water, which you have seen. State how you would determine whether a given specimen of water is hard or soft. If the water is found to be hard, state (with reasons) the various means by which it could be made soft.

3. What means are best employed for the collection of nitric oxide, chlorine, ammonia, carbonic acid, sulphur dioxide, and nitrous oxide gases.

4. Describe fully the experiment in which the re-actions are given by the equation

$$CaCO_3 + 2HCl = CaCl_2 + H_2O + CO_2.$$

5. Describe some of the properties of sulphur, and state its allotropic modifications, and how they are obtained. Sulphur is said to be a *dimorphous* body—explain.

6. Calculate the percentage composition by weight of potassium nitrate, and of the two oxides of carbon.

7. Write down the atomic weight, the molecular weight, the relative weight, the specific gravity, the atomic and the molecular volume of chlorine, and fully explain the meaning of these terms.

8. Complete the following equations:—

$FeS + H_2So_4 =$

$Na_2SO_3 + S =$

$CaO + Na_2CO_3 + HO =$

$Si\ O_2 + 4HF =$

9. Describe a mode of preparing sulphur dioxide, and give and explain the equations representing the re-actions. Explain the difference between the bleaching action of chlorine and sulphurous acid.

10. On completely decomposing by heat a certain weight of potassium chlorate, 20.246 grains of potassium chloride was obtained. What weight of potassium was used, and how much oxygen was evolved?