

# CHAPTER VIII.

## Simple Equations.

**64.** An **equation** asserts that two expressions are equal, but we do not usually employ the word equation in so wide a sense.

Thus the statement  $x + 3 + x + 4 = 2x + 7$ , which is *always* true whatever value  $x$  may have, is called an **identical equation**, or briefly an **identity**.

The parts of an equation to the right and left of the sign of equality are called **members** or **sides** of the equation, and are distinguished as the *right side* and *left side*.

**65.** Certain equations are only true for particular values of the symbols employed. Thus  $3x = 6$  is only true when  $x = 2$ , and is called an **equation of condition**, or more usually an equation. Consequently an *identity* is an equation which is always true whatever be the values of the symbols involved; whereas an *equation* (in the ordinary use of the word) is only true for particular values of the symbols. In the above example  $3x = 6$ , the value 2 is said to **satisfy** the equation. The object of the present chapter is to explain how to treat an equation of the simplest kind in order to discover the value which satisfies it.

**66.** The letter whose value it is required to find is called the **unknown quantity**. The process of finding its value is called **solving the equation**. The value so found is called the **root** or the **solution** of the equation.

**67.** The solution of equations, and the operations subsidiary to it, form an extremely important part of Mathematics. All sorts of mathematical problems consist in the indirect determination of some quantity by means of its relations to other quantities which are known, and these relations are all expressed by means of equations. The operation in general of solving a problem in Mathematics, other than a transformation, is firstly to express the conditions of the problem by means of one or more equations, and secondly to solve these equations. For example, the problem which is expressed by the equation above given is the very

simple question, “What is the number such that if multiplied by 3, the product is 6?” In the present chapter, it is the second of these two operations, the solution of an equation, that is considered.