

## Algebra Introductory Notes

1. Algebra is arithmetic with **variables**
2. Variables are members of a set called the **domain** of the variable. Often a number, often implied rather than stated. Can be any symbol, but commonly a letter of the alphabet or greek alphabet and can have subscripts  
e.g.  $n, x, \vartheta, m_1$
3. **Algebraic expressions** are arithmetic expressions with at least one of the numbers replaced by variables.
  - a. Numbers that multiply variables are called **coefficients**
  - b. Numbers on their own are called **constants**.  
e.g.  $2x + 4$   $x$  is a variable, 2 is the coefficient of  $x$ , 4 is a constant
4. A single algebraic expression represents many arithmetic expressions  
e.g.  $x + 1$  means  $0 + 1, 1 + 1, 2 + 1, 3 + 1, \dots$  if  $x$  is a positive integer
5. **Formulae** are algebraic expressions used to express ideas in a compact way  
e.g.  $s = ut + \frac{1}{2}at^2$  says that the distance travelled by a body in time  $t$  starting at a speed of  $u$  and accelerating at  $a$  will be  $s$ .
6. **Equations** are statements: expression = expression (can be arithmetic or algebraic). They can be true or false.  
e.g.  $x^2 - 9 = 0$  This is only true if  $x = +3$  or  $x = -3$
7. **Inequations** are statements: expression  $\neq$  expression. Also use  $< > \leq \geq$ .  
e.g.  $x^2 - 9 \leq 0$  This is only true if  $x < +3$  and  $x > -3$
8. You need to be able **rearrange** arithmetic expressions and equations using the normal rules of arithmetic.
9. Equations can often be **solved**. This means finding the value(s) of the variables that make the statement true. Do this by making identical changes to both sides of the equation so that a variable is isolated on one side of the equation.