Put MATHS BACK ON TRACK

Save the Children & MATHEMATICS!

QUADRATIC EQUATION

A Genuine

REFORM

Much Needed and **Long Overdue**

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for Excellence in Mathematics

TEACH MATHS (7) - TEACH A FEW TOPICS

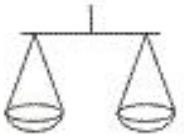
QUADRATIC EQUATION - BASICS

ALGEBRAIC EXPRESSION

Read $3x + 5$ and $3x + 5 = 23$. The second is a complete (English) sentence while the first is not. The first is an *Algebraic Expression*.

An algebraic expression has a value depending upon the value of the variable. If x is 4, the expression is $3(4)+5 = 17$; if x is –2, expression is –1 and so on. Different values of the variable (may) give different values for the expression.

EQUATIONS



$3x + 5 = 23$, $3x + 5 = -4$, $3x + 8 = 7x - 12$, $3x - 2y = 4$, $3x^2 + 2xy = 43$ are all sentences. Each of these says 'something is *equal* to something else'. So these are called *Equations.* we can think of an ordinary balance weighing equal quantities.

INEQUATIONS

If the '=' signs are replaced by anything like $>$, $\geq$, $<$, $\neq$, ... these sentences will no longer be equations. These will be *Ineaquations* or *Inequalities*.

LHS & RHS

Equations have variables their combinations and powers etc.

Examples: $3x + 5 = 0$, $3x - 2y = 4$, $3x^2 + 2xy = 43$, $5x + 6x^3 - 4 = 17$, $3x + 5 = 7x - 12$. All that is to the left of '=' can be referred to as '**L**eft **H**and **S**ide' (LHS) and all that is to the right as '**R**ight **H**and **S**ide' (RHS).

TYPES OF EQUATIONS

Equations can have one or more variables and different degrees of any variable. We shall consider equations with *one variable* only. In our examples we shall use x as the variable.

DEGREE OF AN EQUATION

The **highest *power* of the variable** determines the '***degree***' of the equation.

Power of x	Degree
1	*First Degree* or ***Linear*** equation
2	*Second Degree* or ***Quadratic*** equation
3	*Third Degree* or ***Cubic*** equation
4	*Fourth Degree* equation and so on.

TRUE OR FALSE

Take the equation: $3x + 8 = 7x - 12$. As it is we cannot say much about this. We know it is in one variable, x and is linear (of the first degree).

Let us now apply different values for x and see what happens.
$x = 0$, we get $8 = -12$; this is not true, this is false.
$x = 1$, we get $11 = -5$; this is not true, this is false.
Can we think of a value for x that will make sense?

Try $x = 5$, we get $23 = 23$ and this is true.
Any other value for x will make '$3x + 8 = 7x - 12$' false.

SOLUTION & SOLVING

The value that makes an equation true is a *solution* of the equation. Finding a solution for an equation is called *Solving* the equation.

CONVENTION

By convention, we write these equations so that the RHS is '0' and the terms on the LHS are arranged in descending order of the powers of x like $x^5 + 3x^4 - 5x^3 + 7x^2 + 2x - 34 = 0$

Our special interest is Quadratic Expression and Quadratic Equation.

QUADRATIC EXPRESSION AND EQUATION

An algebraic expression in one variable, usually x, with the highest power of the variable being 2. This contains x^2 term, x^1 term and x^0 (constant) term.

A typical (Standard Form) QUADRATIC EXPRESSION is

$$ax^2 + bx + c$$

where a, b, c are numbers and x is the variable.

a specifies the number of x^2's, b specifies the number of x's and c specifies x^0's.

a is the *coefficient* of x^2 and b is the *coefficient* of x. In ordinary language, a tells how many x^2's are there and b tells how many x's are there.

The standard form of the QUADRATIC EQUATION is:

$$ax^2 + bx + c = 0$$