QUADRATIC EXPRESSIONS AND EQUATIONS

Quadratic Expressions are algebraic expressions which as its variable(s) to have a power of at most 2. For example: $x^2 + 3$, $x^2 + x - 1$, etc.

Quadratic Equations has an equals signs which joins a quadratic expression to either a linear expression, another quadratic expression or a number. For example: $x^2 + 2 = 0$, $x^2 + 2 = 2x + 3$, $3x^2 + 4x = 4x^2 + 3$, etc.

Solving Quadratic Equations

Quadratic equations are usually solved by the following methods:

1. Factorisation
2. Completing the squares
3. Formula
4. Graph

Factorisation Method

To solve a quadratic equation like $ax^2 + bx + c = 0$, using factorisation method, you need to factorise the expression into two linear expressions that are factors. That is $(x + k)$ and $(x + j)$. The value of x is called *root*.

In essence, $ax^2 + bx + c = (x + k)(x + l) = 0$
$\therefore x + k = 0$ or $x + l = 0$
as such $x = -k \; or \; -l$

Example

$x^2 - 7x + 10 = 0$

Solving

$x^2 - 7x + 10 = 0$

$factors \; of \; 10 = \pm(1 \times 10); \; \pm(2 \times 5)$

Factors of +10 that can yield 7: 2 and 5.

$x^2 - x(2 + 5) + 10 = 0$

$x^2 - 2x - 5x + 10 = 0$

$x(x-2)-5(x-2)=0$

$(x-2)(x-5)=0$

$x-2=0$ or $x-5=0$

$x=2$ or 5