October 5th 2022

M9

Equations and Variables

3.1 and 3.2

- So far, we have encountered three different types of algebraic statements:

equations Always have an '=' sign

Expressions have no equal sign

Equation	Expression	Inequality
$x = 5$	$2x$	$x > 0$
$y + 7 = 11$	$x + 1$	$2x + 1 \geq 7$
$x^2 + x + 3 = 0$	$\sqrt{5}x + y$	$-5 < y$
$xy + 3 = x$	$\frac{x}{4} + 13$	$b \leq a + 2$
$\frac{1}{2}x + 6 = y$	$x^2 + y - C$	$x \neq 5$

$\neq$: x is not equal to five. x is different than five

An Equation Layout

Left Side = Right side

LS = RS

LHS = RHS -> (left hand side = Right hand side)

- It is essential that the left side always equals the right side.
- That is why when we solve equations, we have to treat both sides the same – that is, whatever is done to the left side must be done to the right side. !

- Most equations have two types of terms: constants (= numbers only) and variables (letters or letters with coefficients).

Examples of constants, variables, and variables with coefficients:

Constant (has no letter attached)	**Variable** (letters) (this means that the coefficient is either +1 or -1)	**Variable with a Coefficient** (numbers with letter)
5	$x = 1x$	$3 \cdot x$
-4	$xy = 1xy = 1x \cdot 1y$	$-0.5 \cdot y$
0.3	$x^2 = 1x^2$	$\frac{1}{4} \cdot x$
$\frac{1}{2}$	$-y = -1y$	$\sqrt{7}a$
$10\,000$	$-c$	$5x^2$
$\frac{\sqrt{2}}{5}$	z	$-4.2z$

Name of the Operation	**Addition**	**Subtraction**	**Multiplication**	**Division**
	$+$	$-$	$\cdot$, $\times$, $()()$	$\frac{\square}{\square}$, $\div$
Name of the result	Sum	difference	Product	Quotient