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EB Education Revision Guide

How to work with Algebra: Part 1

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What you need to know about Algebra: Part 1

Including:

- The Basics – What is Algebra
- Terms and Expressions
- Simplifying
- Multiplying letters

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The Basics:

How to do it:

In algebra letters are used to represent numbers that are unknown.

Example:

Josh has some apples, we don't know how many he has, so we can say

Josh has *x* apples.

If Josh was given 3 more apples we could say.

Josh has *x* + 3 apples

If Josh ate 4 of these apples we could say

Josh has *x* – 4 apples

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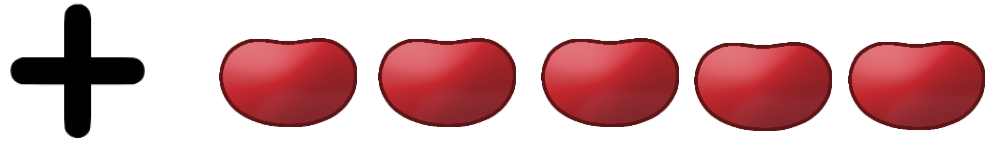
The Basics:

Example:

There are **p** sweets in the pot

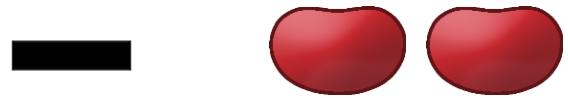
If I add 5 sweets I have

p + 5



If I take 2 sweets away I have

p – 2



If I added another pot with the same number of sweets in I would have

2p

Terms and Expressions

How to do it:

A **TERM** is either a single number or collection of numbers, letters and brackets, all multiplied/divided together.

Algebraic terms, like 2n or 5y leave the multiplication signs out. So 2n actually means 2 x n.

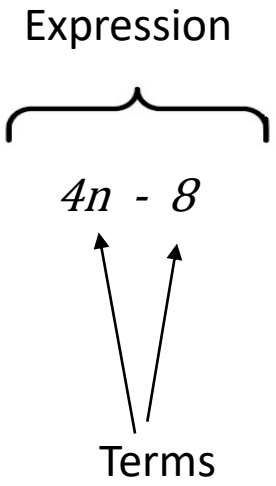
Terms are separated by + or –signs.

Every term is either negative or positive. If it does not have a minus sign in front of it, then it is positive.

An **EXPRESSION** is numbers, symbols and operators (such as + and ×) grouped together that show the value of something.

Example:

$2y \quad 3 \quad 5x^2 \quad -7x$



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Simplifying or Collecting Like Terms

How to do it

When you simplify an algebraic expression, you need to "collect like terms".

This means you add or subtract all the terms which are the same.

You could underline or circle like terms to help you know what to add/subtract.

Example 1

$n + n + n + 2n + 4n = 9n$

They are all n's so add them all together

$5s + 6s - 3s = 8s$

They are all s's so add them together, then subtract

$8y + 4 + 3y + 6$

You need to add the y's together $8y + 3y = 11y$

Then you add the numbers together $+ 4 + 6 = 10$

$8y + 4 + 3y + 6 = 11y + 10$

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Simplifying

Example 2:

$9x + 4 - 6x - 2$

i) $9x - 6x = 3x$ **Subtract the x's**

ii) $4 - 2 = 2$ **Subtract the numbers**

so $9x + 4 - 6x - 2 = 3x + 2$

Put back together again

Example 3:

$7x + 3y - 3x + 8y$

i) $7x - 3x = 4x$ **Subtract the x's**

ii) $3y + 8y = 11y$ **Subtract the y's**

so $7x + 3y - 3x + 8y = 4x + 11y$

Put back together again

Remember:
You can't add x and y terms together because they're not the same type of term!

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Simplifying

Example 4:

$4a - 5a^2 + 2a + 3a^2$

Remember that a and a^2 are different terms.

$4a + 2a = 6a$

$-5a^2 + 3a^2 = -2a^2$

$4a - 5a^2 + 2a + 3a^2 = 6a - 2a^2$

Example 5:

$-6w^2 - 3w + 8t + 4w - 2w^3 + w^2 - 5w^3$

Remember that w, w^2 and w^3 are all different terms.

$-6w^2 + w^2 = -5w^2$

$-3w + 4w = w$

$-2w^3 - 5w^3 = -7w^3$

$= 8t - 5w^2 + w - 7w^3$

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Negative numbers

How to do it:

You need to remember the same basic rules apply to letters in the same way as to numbers.

Remember these rules.

+ + makes +

+ - makes -

- + makes -

- - makes +

You will need to use these when:

a) Multiplying or dividing

b) Two signs are together

Examples:

-4 x 6 = -24

3 x -2 = -6

-5 x -8 = + 40

-4n x 6 = -24n

3n x -2 = -6n

-5n x -8 = +40n

4 - - 8 = 4 + 8 = 12

$-x + -y = -x - y$

Multiplying letters

How to do it:

You need to remember the basic rules for multiplying letters together.

abc means a x b x c

a^2b means a x a x b

ab^2 means a x b x b

$(ab)^2$ means a x a x b x b

a^5 means a x a x a x a x a

(Powers tell you how many times the letters are multiplied together).

Example:

Simplify

m x m x m x m

There are 4 m's multiplied together so it is

m^4

Simplify 5n x 4t x 3

5 x 4 x 3 = 60 **Multiply the numbers together**

n x t = nt **Multiply the letters together**

= 60nt

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Set 1:

1. y + y
2. 5a + a
3. f + 3f + 2f
4. 7b + d + 3e + d + 2e
5. 5b – e + 3b +6e
6. 7a – 3b – 2a + b

Set 2:

1. w x w
2. f x f x f
3. 5n x n
4. 6t x 2t
5. 8m x 2m x 2
6. 4n x 2n x n

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Set 3:

Write expressions for the following:

1. The sum of a and 9
2. c multiplied by 6
3. 7 less than y
4. 3 larger than p
5. n multiplied by itself 3 times
6. t divided by 4

Set 4:

Write expressions for the following:

1. There are c students auditioning for a place in the school play. Only 3 get a part.

How many are not chosen?

2. Cerys is running a marathon and r students have sponsored her. She was hoping for 4 times as many sponsors.

How many sponsors does Cerys want?

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Answers:

Set 1:

1. $2y$
2. $6a$
3. $6f$
4. $7b + 2d + 5e$
5. $8b + 5e$
6. $5a – 2b$

Set 2:

1. w^2
2. f^3
3. $5n^2$
4. $12t^2$
5. $32m^2$
6. $8n^3$

Answers:

Set 3:

1. a + 9
2. 6c
3. y – 7
4. p + 3
5. n^3
6. $\frac{t}{4}$

Set 4:

1. c – 3
2. 4r

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For more help and resources, or to work with us as a tutor, please contact us

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contact@ebeducationservices.co.uk

0161 442 5270

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