Year 8 Maths Topics 7,8&9
Brackets, Equations, Sequences & Indices

Week 1

This week we are going to recap how to form **algebra expressions**. We simplify 3 x a to 3a, always writing the number in front of the letter. Division is written as a fraction e.g. $\frac{b}{5}$ means $b \div 5$. We will also recap how to use **directed numbers** with algebra. Positive and a negative goes to negative Negative and a negative goes to positive.
We will then learn how to expand a single bracket. To **expand a bracket** you multiply everything inside the bracket by what is outside the bracket. You can do it in a grid.
E.g. $3(x + 2) = 3x + 6$

x	x	+2
3	$3x$	+6

Week 2

This week we are going to expand multiple brackets and simplify our answer. To do this we will expand each bracket separately and combine our answers together.
E.g. $3(x + 2)$ - $2(x + 1)$
$3(x + 2) = 3x + 6$ $\quad -2(x + 1) = -2x - 2$
$3(x + 2)$ - $2(x + 1) = 3x + 6 - 2x - 2 = \boldsymbol{x + 4}$
Higher learners will also expand double brackets.
We will also learn to factorise an expression. **Factorise** means to add the brackets into the expression. We look at each part of the expression to find a common factor, we put this outside the bracket. We then work out what we need to multiply it by to get back to the original expression. E.g. $3x + 6 = 3(x + 2)$

Week 3

This week we will practice **solving equations**. We will recap how to solve 2-step equations and then add in equations with brackets.
To solve equations we use the **inverse**, this means the opposite operation.
E.g. Solve $4x - 5 = 27$ INVERSE +5
$+5 \quad +5$
$4x = 32$ INVERSE ÷4
$\div 4 \quad \div 4$
$\boldsymbol{x = 8}$
When you add in a bracket it becomes a 3-step equation as the first step becomes to expand the brackets.
Higher learners will also learn to solve equations with an unknown on both sides.

Week 4

This week we will look at **inequalities.**
Inequalities are not equal to something but instead tell you what it can be.
< means less than
≤ means less than or equal to
> means greater than
≥ means greater than or equal to
We will solve inequalities in the same way we solved equations by using the inverse.
We will learn the difference between
Expression: doesn't have an = sign
Equation: has an = sign and can be solved
Formula: equation with more than one letter
Identity: has the ≡ sign true for lots of values

Week 5

This week we will work on **Sequences**, a list of numbers that follows a pattern or rule.
We will generate a sequence from a rule written in words such as start at 7 and add 3 each time – 7, 10, 13, 16, 19 …
We will then go on to generate a sequence from an algebraic rule e.g. 4n-2. We will do this by substituting n with the numbers 1,2,3,4 etc.
We will think of the expression as a function machine, 4n-2 means multiply it by 4 and then subtract 2.

n	1	2	3	4
4n-2	2	6	10	14

We will also work backwards to get the expression from the sequence. This is called the nth term. It helps you work out any number in the sequence.

Week 6

This week we will work on **Indices.** When we talk about indices we mean powers (the small number at the top.

We can add or subtract them if the have the same base and power by collecting like terms. E.g. $2x^2 + 4x^2 = 6x^2$ If the have a different base or power we cannot collect them together. E.g. $2x^2$-$3x^3 + 4x^2 = 6x^2$ -$3x^3$
If they have the same base we can multiply them together by keeping the base and adding the powers. E.g. $x^4 \times x^5 = x^9$
We can divide them by subtracting the powers if they have the same base. E.g.
$x^{12} \div x^5 = x^7$

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Week 1

Questions	Answers
What type of maths using letters to represent numbers?	Algebra
How do you write 6 multiplied by x in algebra notation?	$6x$
What does $\frac{7}{y}$ mean?	7 divided by y
If you multiply a positive number by a negative number, will the answer be positive or negative?	Negative
How do you expand a bracket?	By multiplying everything inside the bracket by what is outside the bracket

Week 2

Questions	Answers
How do you expand multiple brackets?	Expand each bracket in turn and combine your answers
How do you simplify your answer?	By collecting the like terms
What does factorise mean?	To put the brackets into the expression
How do you factorise an expression?	By finding a common factor of all the terms and putting it outside the brackets.
True or False Factorising is the opposite of expanding	True

Week 3

Questions	Answers
What is an equation?	An algebraic expression that is equal to something and can be solved.
What does solve the equation mean?	To find out what value the letter is
How many steps are needed to solve $4x - 5 = 27$?	2 steps
What do we use to solve equations?	The inverse operations
What would the first step in solving this equation be? 3(x+4)=33	To expand the brackets

Week 4

Questions	Answers
What is an inequality?	Inequalities are not equal to something but instead tell you what it can be.
What does the ≤ symbol mean?	Less than or equal to
What symbol do you use for "greater than"	>
What is the difference between an expression and an equation?	An equation has an = sign but an expression does not
What makes an equation become a formula?	When it contains more than one letter.

Week 5

Questions	Answers
What is a sequence?	A list of numbers that follows a pattern or rule.
How do you turn an expression into a sequence?	By substituting the numbers 1,2,3… into the expression
What strategy can help you substitute into the expression	To think of it as a function machine.
What is the nth term of a sequence?	An expression that allows you to work out any number in the sequence
What function machine would you use to generate a sequence for $2n + 5$	Multiply it by 2 and then add 5

Week 6

Questions	Answers
An indice or index is another name for what?	A power
What do you call the number in front of the base and power?	The coefficient
What are like terms?	Terms with the same base and power
How do you add or subtract indices?	By collecting like terms
How do you multiply or divide indices?	Add the powers for multiplying, subtract the powers for dividing, if they have the same base.