THE DUSTON SCHOOL

Knowledge itself is power

Year 8 Maths

Knowledge Organiser

Term 2

Name:	Class:

Keyword	Definition
Simplify	To make simpler or easier to understand by reducing the size of numbers or the number of terms.
Like terms	Terms which have the exact same letters in an expression.
Expression	One or more terms combined by addition or subtraction.
Function	A special relationship where each input has one output.
Substitute	Replace something in an expression with something else which is equal to it.
Numerator	The top number in a fraction.
Denominator	The bottom number in a fraction.
Improper Fraction	A fraction where the numerator is not smaller than the denominator.
Mixed Number	A combination of a whole number and a fraction.
Product	The result of multiplication.
Percent	Out of 100
Simplify	To make simpler or easier to understand by reducing the size of numbers or the number of terms.
Reciprocal	The result of dividing 1 by the number.

Homework 1 due:	
Homework 2 due:	
Homework 3 due:	
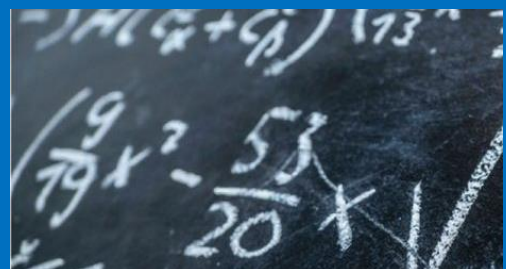
Term 2 Overview

Big Questions for the term

Simplifying and substitution

- What do we already know?
- What does it mean to simplify an expression?
- How do we form expressions?
- What is a function machine?
- What does it mean to expand brackets?
- What does it mean to factorise?
- How do we expand double brackets?

Fractions, decimals and percentages

- What did we learn in Year 7?
- How do we convert Fractions, Decimals and Percentages?
- What is a decimal multiplier and how can they help with calculations?

Knowledge Retrieval Questions – From Year 7

Unit 1 – Calculations and Accuracy

#	Question	Answer
1	What does the word sum mean?	The result of addition.
2	What does consecutive mean?	Following each other continuously.
3	How do you find the difference between two numbers?	Subtract the smaller number from the larger one.
4	What should your answer be if the question tells you to calculate?	A number
5	What should your answer be if the question tells you to evaluate?	A number
6	How do you divide a number by 10?	Move all the digits 1 place to the right
7	How do you multiply a number by 10?	Move all the digits 1 place to the left
8	What is subtracting a negative number equivalent to?	Adding a positive number
9	What is adding a negative number equivalent to?	Subtracting a positive number
10	What is a term-to-term rule?	A rule telling you how to get from one term to the next in a sequence
11	In a sequence, what is meant by a term?	One of the numbers in the sequence
12	What is the first step when trying to find the next term in a sequence?	Identify the pattern.
13	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
14	How do you work out the value of a digit in a long number?	Ignore every other digit (make them zeroes)
15	How do you add decimals?	Same method as usual, lining up the decimal points
16	How do you subtract decimals?	Same method as usual, lining up the decimal points

Unit 2 – Integers, Powers and Roots

#	Question	Answer
1	What does the word product mean?	The result of a multiplication.
2	What sign would the product of 2 negative numbers have?	Positive
3	What sign would the product of a positive and a negative number have?	Negative
4	What sign would the answer to a negative number divided by a positive number have?	Negative
5	What is the definition of a square number?	The product of a number and itself
6	List the first 15 square numbers.	1,4,9,16,25,36,49,64,81,100,121,144,169,196,225
7	What is the definition of a factor?	A number which divides another number exactly.
8	What is the definition of a multiple?	A number in another number's times table.
9	What does HCF stand for?	Highest Common Factor
10	What does LCM stand for?	Lowest Common Multiple
11	What is a cube number?	The product of 3 equal numbers.
12	Why do we use BIDMAS?	Order of operations
13	What is the definition of a prime number?	A number with only 2 factors.

Unit 3 – Simplifying and substitution

#	Question	Answer
1	In algebra, what does "collecting like terms" mean?	Adding or subtracting terms with the exact same letters
2	In algebra, what is substitution?	Replacing something in an expression with something else which is equal to it
3	The symbol for which operation is not written in algebra?	Multiplication
4	How is division represented algebraically?	As a fraction
5	How do you write expressions from sentences?	Replace unknown numbers with letters, everything else should be a number or an operation.

Unit 4 – Fractions, decimals and percentages

#	Question	Answer
1	What is a numerator?	Top number in a fraction
2	What is a denominator?	Bottom number in a fraction
3	What operation does a fraction represent?	Division
4	Which operation do we use for the word 'of'?	Multiplication
5	What's the first step when adding or subtracting fractions?	Write the fractions with a common denominator
6	How do you multiply fractions?	Multiply the numerators and multiply the denominators.
7	How do you convert a decimal to a percentage?	Multiply by 100 (%)

8	How do you simplify fractions?	Divide both the numerator and denominator by a common factor.
9	How do you find an equivalent fraction?	Multiply or divide the numerator and denominator by the same number.
10	How do you find a fraction of an amount?	Divide the amount by the denominator and multiply by the numerator.
11	What does percent mean?	Out of 100
12	How do you convert a fraction to a decimal if the denominator is a factor of 100?	Write the equivalent fraction with a denominator of 100 (then divide by 100)
13	How do you convert a decimal to a fraction?	The numerator is the same digits without the decimal point, the denominator is the place value of the last digit.
14	How do you convert a percentage to a decimal?	Divide by 100 (%)

Knowledge Retrieval Questions – For Year 8

Unit 1 – Calculations and Accuracy

#	Question	Answer
1	How do you find the median when you have an odd number of pieces of data?	Put the numbers in order and select the middle number
2	How do you find the median when you have an even number of pieces of data?	Put the numbers in order and find the mean of the two middle numbers
3	How do you find the range of a set of data?	Largest number - Smallest number
4	How do you divide by a decimal?	Multiply both numbers by 10 repeatedly until you are dividing by a whole number
5	How do you use a calculation to work out the answer to another calculation with the same digits?	Compare each number to the original number, multiply or divide by powers of 10, as appropriate
6	What are decimal places?	Digits to the right of a decimal point
7	How do you round to 2 decimal places?	Look at the 3rd decimal place, if less than 5 - round down, if 5 or more - round up

Unit 2 – Integers, Powers and Roots

#	Question	Answer
1	How do you estimate a square root?	Identify the square numbers either side of it
2	How do you simplify the product of two powers with the same base?	Add the indices together
3	How do you simplify the division of two powers with the same base?	Subtract the second index from the first
4	What is the answer to any number raised to the power zero?	1
5	How do you simplify a power raised to another power?	Multiply the indices together
6	How is a negative index related to the same positive index?	The negative index is the reciprocal of the positive one
7	How do you determine the index when converting large numbers into standard form?	It is the number of digits after the first non-zero digit
8	How do you determine the index when converting small numbers into standard form?	It is the number of digits before the first non-zero digit
9	The first part of a number written in standard from should be between which 2 numbers?	1 and 10 (smaller than 10...)

Unit 3 – Simplifying and substitution

#	Question	Answer
1	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.
2	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside.
3	How do you expand double brackets?	Multiply each of the terms in the first bracket by each of the terms in the second bracket.
4	What is the first step in factorising into single brackets?	Find the highest common factor of the terms.

Unit 4 – Fractions, decimals and percentages

#	Question	Answer
1	With a calculator, how do you convert a decimal to a percentage?	Multiply by 100 (%)
2	With a calculator, how do you convert a decimal to a fraction?	Type the decimal in and press =
3	With a calculator, how do you convert a fraction to a percentage?	Multiply by 100 (%) and press S <=> D
4	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by S <=> D
5	With a calculator, how do you convert a percentage to a decimal?	Type the percentage in and press =, followed by S <=> D
6	With a calculator, how do you convert a percentage to a fraction?	Type the percentage in and press =

Term 2 - Homework 1 – IPR years 7 and 8

#	Type	Question	Answer
1	Knowledge	How is a negative index related to the same positive index?	
	Application 1	Write 6^{-4} using a positive index	
	Application 2	Write 5^{-3} using a positive index	

#	Type	Question	Answer
2	Knowledge	The first part of a number written in standard from should be between which 2 numbers?	
	Application 1	What is the initial number when 3530000000 is written in standard form?	
	Application 2	What is the initial number when 91800000000 is written in standard form?	

#	Type	Question	Answer
3	Knowledge	How do you determine the index when converting large numbers into standard form?	
	Application 1	What is the index when the number 148000 is written in standard form?	
	Application 2	What is the index when the number 93800 is written in standard form?	

#	Type	Question	Answer
4	Knowledge	How do you simplify the product of two powers with the same base?	
	Application 1	Simplify $13^5 \times 13^6$	
	Application 2	Simplify $16^6 \times 16^3$	

#	Type	Question	Answer
5	Knowledge	What is the definition of a factor?	
	Application 1	Give an example of a factor of 21	
	Application 2	Give an example of a factor of 49	

#	Type	Question	Answer
6	Knowledge	What sign would the product of 2 negative numbers have?	
	Application 1	What is the product of -3 and -2?	
	Application 2	What is the product of -7 and -2?	

#	Type	Question	Answer
7	Knowledge	What does LCM stand for?	
	Application 1	What is the LCM of 5 and 5?	
	Application 2	What is the LCM of 8 and 13?	

#	Type	Question	Answer
8	Knowledge	List the first 15 square numbers.	
	Application 1	What is the 9th square number?	
	Application 2	What is the 19th square number?	

#	Type	Question	Answer
9	Knowledge	Why do we use BIDMAS?	
	Application 1	Calculate $37 + 5 \times 5$	
	Application 2	Calculate $180 + 6 \times 6$	

#	Type	Question	Answer
10	Knowledge	What does HCF stand for?	
	Application 1	What is the HCF of 24 and 44?	
	Application 2	What is the HCF of 72 and 66?	

#	Type	Question	Answer
11	Knowledge	How do you determine the index when converting small numbers into standard form?	
	Application 1	What is the index when the number 0.00000203 is written in standard form?	
	Application 2	What is the index when the number 0.000787 is written in standard form?	

#	Type	Question	Answer
12	Knowledge	What is the definition of a square number?	
	Application 1	What is the 7th square number?	
	Application 2	What is the 19th square number?	

#	Type	Question	Answer
13	Knowledge	How do you simplify the division of two powers with the same base?	
	Application 1	Simplify $12^5 \div 12^3$	
	Application 2	Simplify $15^6 \div 15^5$	

#	Type	Question	Answer
14	Knowledge	What sign would the answer to a negative number divided by a positive number have?	
	Application 1	Calculate -4 divided by 2	
	Application 2	Calculate -21 divided by 3	

#	Type	Question	Answer
15	Knowledge	What is a cube number?	
	Application 1	What is 5 cubed?	
	Application 2	What is 7 cubed?	

<u>Workings Space</u>

Term 2 - Homework 2 – S&S years 7 and 8

#	Type	Question	Answer
1	Knowledge	What is the first step in factorising into single brackets?	
	Application 1	What is the highest common factor of $4x^2$ and $16y^3$?	
	Application 2	What is the highest common factor of $6x$ and $24x^3$?	

#	Type	Question	Answer
2	Knowledge	How do you write expressions from sentences?	
	Application 1	Write '9 lots of a number plus 3' as an expression.	
	Application 2	Write '4 less than k' as an expression.	

#	Type	Question	Answer
3	Knowledge	How do you expand double brackets?	
	Application 1	Expand $(w + 1)(w + 2)$	
	Application 2	Expand $(w + 4)(w + 6)$	

#	Type	Question	Answer
4	Knowledge	The symbol for which operation is not written in algebra?	
	Application 1	How do you write 3 multiplied by k algebraically?	
	Application 2	How do you write f multiplied by 6 algebraically?	

#	Type	Question	Answer
5	Knowledge	How do you expand single brackets?	
	Application 1	Expand $3u(6u - 4)$	
	Application 2	Expand $5u(5u - 2)$	

#	Type	Question	Answer
6	Knowledge	When are brackets used in an expression?	
	Application 1	Write this as an expression: y subtract p all divided by a	
	Application 2	Write this as an expression: y add r all multiplied by d	

#	Type	Question	Answer
7	Knowledge	In algebra, what is substitution?	
	Application 1	Evaluate 8x + 3y, if x = 3 and y = 3	
	Application 2	Evaluate 6x + 7y, if x = 6 and y = 6	

#	Type	Question	Answer
8	Knowledge	In algebra, what does "collecting like terms" mean?	
	Application 1	Simplify the following expression: 10p + 8q - 3p + 3q	
	Application 2	Simplify the following expression: 7p + 6q - 7p + 6q	

#	Type	Question	Answer
9	Knowledge	How is division represented algebraically?	
	Application 1	How do you write b divided by 3 algebraically?	
	Application 2	How do you write 6 divided by c algebraically?	

<u>Workings Space</u>

Term 2 - Homework 3 – IPR and S&S year 8

#	Type	Question	Answer
1	Knowledge	How do you expand single brackets?	
	Application 1	Expand 2(8q - 5)	
	Application 2	Expand 3v(4v - 3)	

#	Type	Question	Answer
2	Knowledge	The first part of a number written in standard from should be between which 2 numbers?	
	Application 1	What is the initial number when 0.0023 is written in standard form?	
	Application 2	What is the initial number when 0.715 is written in standard form?	

#	Type	Question	Answer
3	Knowledge	How do you expand double brackets?	
	Application 1	Expand (z + 4)(z + 6)	
	Application 2	Expand (t + 2)(t + 9)	

#	Type	Question	Answer
4	Knowledge	What is the first step in factorising into single brackets?	
	Application 1	What is the highest common factor of $4x^2$ and $16x^3$?	
	Application 2	What is the highest common factor of 5y and 10y ?	

#	Type	Question	Answer
5	Knowledge	How do you determine the index when converting small numbers into standard form?	
	Application 1	What is the index when the number 0.0129 is written in standard form?	
	Application 2	What is the index when the number 0.00000151 is written in standard form?	

#	Type	Question	Answer
6	Knowledge	What is the answer to any number raised to the power zero?	
	Application 1	Evaluate 13^0	
	Application 2	Evaluate 11^0	

#	Type	Question	Answer
7	Knowledge	How do you determine the index when converting large numbers into standard form?	
	Application 1	What is the index when the number 229000000 is written in standard form?	
	Application 2	What is the index when the number 230000000 is written in standard form?	

#	Type	Question	Answer
8	Knowledge	When are brackets used in an expression?	
	Application 1	Write this as an expression: w subtract p all multiplied by d	
	Application 2	Write this as an expression: y add p all divided by a	

#	Type	Question	Answer
9	Knowledge	How do you simplify a power raised to another power?	
	Application 1	Simplify $(14^6)^4$	
	Application 2	Simplify $(20^3)^3$	

#	Type	Question	Answer
10	Knowledge	How do you simplify the division of two powers with the same base?	
	Application 1	Simplify $15^3 \div 15^4$	
	Application 2	Simplify $18^6 \div 18^3$	

#	Type	Question	Answer
11	Knowledge	How is a negative index related to the same positive index?	
	Application 1	Write 6^{-7} using a positive index	
	Application 2	Write 4^{-5} using a positive index	

#	Type	Question	Answer
12	Knowledge	How do you estimate a square root?	
	Application 1	Between which two integers is the square root of 49?	
	Application 2	Between which two integers is the square root of 85?	

#	Type	Question	Answer
13	Knowledge	How do you simplify the product of two powers with the same base?	
	Application 1	Simplify $17^3 \times 17^6$	
	Application 2	Simplify $18^4 \times 18^5$	

<u>Workings Space</u>