THE DUSTON SCHOOL
Knowledge itself is power
TDS 4-19

Year 8 Maths
Knowledge Organiser
Term 1

Name:	Class:

Keyword	Definition
Integer	A whole number
Ascending	Increasing in size, going up
Descending	Decreasing in size, going down
Decimal	A way of writing numbers which aren't whole. The whole number and the decimal fraction are separated by a decimal point.
Decimal Places	The numbers that come after a decimal point
Factor	A number which the amount can be divided by without leaving a remainder
Multiple	A number which is the result of multiplying an amount by an integer
Prime	A number with only two factors.
Square (n)	A number formed by multiplying an amount by itself
Cube (n)	A number formed by raising an amount to the power of 3.

Homework 1 due:	
Homework 2 due:	
Homework 3 due:	

RESPECT

In Mathematics, a classroom environment should always be respectful. Students can show respect through:

- **Supporting each other with their learning.** Pupils should recognise that every individual has their own strengths and weaknesses and, as a class, we should 'up-lift' students.
- **Students should not be felt to be rushed by others in the classroom**. Respect that all students have different experiences and therefore will access the knowledge at different rates.
- **Being Polite.** As no different to the rest of school. Students should embrace diversity and treat all others with tolerance and decency.

ASPIRATION

- **Building logical processes.** Understanding that learning mathematical concepts improves our logical reasoning which improves other aspects of our lives: language, culture, games etc. the essence of mathematics is in respect of ideas, structures and relationships by logical reasoning.
- **Every day needs.** Understanding that being numerate, along with literate, is a strong indicator of long-term success and students' ability to climb the tree of knowledge.

RESILIENCE

- **I don't know it… yet.** Understanding that maths can be abstract and that, as with anything new, it will take time to learn. With time, you will succeed.
- **Mathematical concept won't always come easily.** Understanding that getting things wrong is a frustrating and not pleasant feeling but, to succeed, it is a passage we need to go through.
- **Practice makes permanent.** Mathematics is a logical subject such that, rehearsal and repetition of method is the key to being successful and committing the knowledge to long-term memory. This process takes time and will come with failures along the way which we must persevere through.

Term 2 Overview

Big Questions for the term

Calculations and Accuracy

- What is median and range?
- How do Decimals affect calculations?
- How do negatives affect calculations?
- What are the functions on a calculator?

Integers, Powers and Roots

- What did we learn in year 7?
- What is index notation and why do we have it?
- What does it mean to 'root' a number?
- How can we perform operations with Index Notation?
- What is Standard Form and why do we use it?

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	How do you divide by a fraction?	Multiply by its reciprocal (the fraction flipped over)
13	What is the definition of a prime number?	A number with only 2 factors.

Knowledge Retrieval Questions – From Year 8

Unit 1 – Calculations and Accuracy

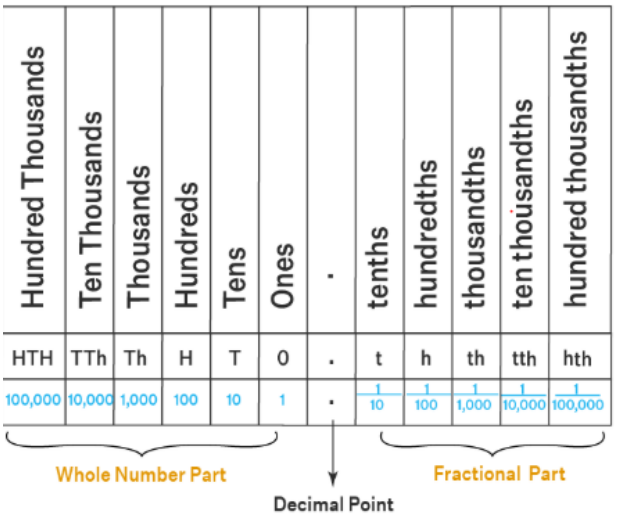
#	Question	Answer
1	How do you find the median when you have an odd number of pieces of data?	Put the numbers in order and select the middle number
2	How do you find the median when you have an even number of pieces of data?	Put the numbers in order and find the mean of the two middle numbers
3	How do 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

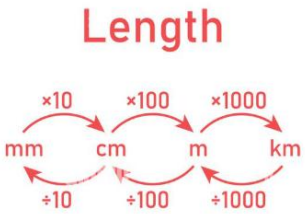
Unit 2 – Integers, Powers and Roots

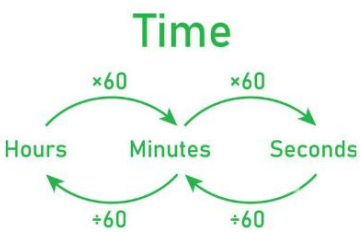
#	Question	Answer
1	How do you estimate a square root?	Identify the square numbers either side of it
2	How do you simplify the product of two powers with the same base?	Add the indices together
3	How do you simplify the division of two powers with the same base?	Subtract the second index from the first
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…)

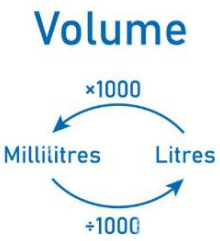
Multiplication Chart

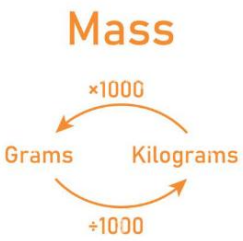
X	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

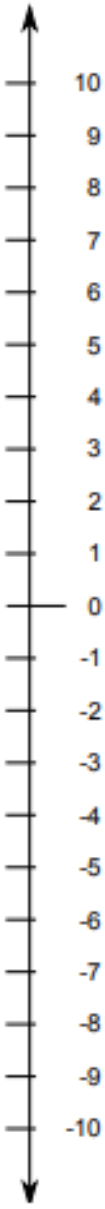












Remote-Learning

If you are absent from school, lesson work can be found on your year group Teams channel: files -> class materials -> maths

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This website is useful to students as it contains videos to support students understanding and also extra questions to extend and support students.

Please see your class teacher for any login issues

vle.mathswatch.co.uk

Username: firstnamesurname@dustonschool

Password: berrywood

Term 1 Homework 1

#	Type	Question	Answer
1	Knowledge	In a sequence, what is meant by a term?	One of the numbers in the sequence
	Application 1	What is the third term in the following sequence? 44, 95, 146, 197, 248	
	Application 2	What is the third term in the following sequence? 156, 311, 466, 621, 776	
2	Knowledge	How do you divide a number by 10?	Move all the digits 1 place to the right
	Application 1	Calculate 44 divided by 10	
	Application 2	Calculate 15.6 divided by 10	
3	Knowledge	What does the word sum mean?	The result of addition.
	Application 1	What is the sum of 34 and 52?	
	Application 2	What is the sum of 1769 and 462?	
4	Knowledge	How do you find the difference between two numbers?	Subtract the smaller number from the larger one.
	Application 1	What is the difference between 44 and 51?	
	Application 2	What is the difference between 156 and 155?	
5	Knowledge	How do you work out the value of a digit in a long number?	Ignore every other digit (make them zeroes)
	Application 1	What is the value of the 5 in the number 64589?	
	Application 2	What is the value of the 2 in the number 52163?	

#	Type	Question	Answer
6	Knowledge	What is adding a negative number equivalent to?	Subtracting a positive number
	Application 1	Evaluate 8 + (-9)	
	Application 2	Evaluate 12 + (-15)	
7	Knowledge	What is a term-to-term rule?	A rule telling you how to get from one term to the next in a sequence
	Application 1	What is the term-to-term rule in the following sequence 4, 9, 14, 19, 24?	
	Application 2	What is the term-to-term rule in the following sequence 11, 31, 51, 71, 91?	
8	Knowledge	How do you add decimals?	Same method as usual, lining up the decimal points
	Application 1	Calculate 5.1 + 4.4	
	Application 2	Calculate 15.5 + 15.67	
9	Knowledge	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
	Application 1	Is the following sequence linear? 5, 7, 8, 10	
	Application 2	Is the following sequence linear? 22, 44, 68, 90	
10	Knowledge	How do you subtract decimals?	Same method as usual, lining up the decimal points
	Application 1	What is the difference between 0.68 and 5.4	
	Application 2	What is the difference between 1.86 and 13.2	

#	Type	Question	Answer
11	Knowledge	What should your answer be if the question tells you to calculate?	A number
	Application 1	Calculate 8 multiplied by 9	
	Application 2	Calculate 12 multiplied by 2	
12	Knowledge	What is subtracting a negative number equivalent to?	Adding a positive number
	Application 1	Calculate 4 - (-9)	
	Application 2	Calculate 11 - (-12)	
13	Knowledge	How do you divide a number by 10?	Move all the digits 1 place to the right
	Application 1	Calculate 44 divided by 10.	
	Application 2	Calculate 156 divided by 10.	
14	Knowledge	How do you multiply a number by 10?	Move all the digits 1 place to the left
	Application 1	Evaluate 51 multiplied by 10.	
	Application 2	Evaluate 155 multiplied by 10.	
15	Knowledge	What should your answer be if the question tells you to evaluate?	A number
	Application 1	Evaluate 44 + 37	
	Application 2	Evaluate 156 + 114	

Term 1 Homework 2

#	Type	Question	Answer
1	Knowledge	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
	Application 1	Is this sequence linear? 2, 4, 9, 11, …	
	Application 2	Is this sequence linear? 24, 48, 68, 92, …	
2	Knowledge	How do you add decimal?	Same method as usual, lining up the decimal points.
	Application 1	Calculate 1.6 + 9.9	
	Application 2	Calculate 17.4 + 13.5	
3	Knowledge	How do you divide a number by 10?	Move all the digits 1 place to the right
	Application 1	Calculate 99 divided by 10.	
	Application 2	Calculate 135 divided by 10.	
4	Knowledge	How do you find the range of a set of data?	Largest number - Smallest number
	Application 1	What is the range of the following data: 11, 15, 12, 11, 14	
	Application 2	What is the range of the following data: 12, 20, 16, 17, 15	
5	Knowledge	How do you find the difference between two numbers?	Subtract the smaller number from the larger one.
	Application 1	What is the difference between 99 and 16?	
	Application 2	What is the difference between 135 and 174?	

#	Type	Question	Answer
6	Knowledge	How do you divide a number by a decimal?	Multiply both numbers by 10 repeatedly, until you are dividing by a whole number.
	Application 1	Evaluate 7.2 ÷ 0.8 =	
	Application 2	Evaluate 480 ÷ 0.06 =	
7	Knowledge	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
	Application 1	Is the following sequence linear? 2, 4, 9, 11	
	Application 2	Is the following sequence linear? 24, 48, 68, 92	
8	Knowledge	What is the first step when trying to find the next term in a sequence?	Identify the pattern
	Application 1	What is the next term in the sequence 2, 4, 6, 8, 10, ..?	
	Application 2	What is the next term in the sequence 9, 4, -1, … ?	
9	Knowledge	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
	Application 1	Given that 7990 x 47 = 3827210. What is 799 x 470?	
	Application 2	Given that 4680 x 726 = 3397680. What is 46.8 x 72.6?	
10	Knowledge	What is a term-to-term rule?	A rule telling you how to get from one term to the next in a sequence
	Application 1	What is the term-to-term rule in the following sequence 2, 4, 6, 8, 10?	
	Application 2	What is the term-to-term rule in the following sequence 20, 32, 44, 56, 68?	

#	Type	Question	Answer
11	Knowledge	How do you work out the value of a digit in a long number?	Ignore every other digit (make them zeroes)
	Application 1	What is the value of the 2 in the number 31256?	
	Application 2	What is the value of the 4 in the number 74385?	

12	Knowledge	What is adding a negative number equivalent to?	Subtracting a positive number
	Application 1	Evaluate 10 + (-5)	
	Application 2	Evaluate 15 + (-13)	

13	Knowledge	What does the word sum mean?	The result of addition.
	Application 1	What is the sum of 2 and 2?	
	Application 2	What is the sum of 20 and 12?	

14	Knowledge	What is subtracting a negative number equivalent to?	Adding a positive
	Application 1	Calculate 2 – (–2)	
	Application 2	Calculate 20 – (–17)	

Term 1 Homework 3

#	Type	Question	Answer
1	Knowledge	Why do we use BIDMAS?	Order of operations
	Application 1	Calculate 19 + 1 × 5	
	Application 2	Calculate 132 + 16 × 20	
2	Knowledge	What is a cube number?	The product of 3 equal numbers.
	Application 1	What is 4 cubed?	
	Application 2	What is 8 cubed?	
3	Knowledge	Do you know your square numbers?.	These can be found in your knowledge retrieval
	Application 1	What is the 4th square number?	
	Application 2	What is the 20th square number?	
4	Knowledge	What does LCM stand for?	Lowest Common Multiple
	Application 1	What is the LCM of 5 and 4?	
	Application 2	What is the LCM of 8 and 15?	
5	Knowledge	What does HCF stand for?	Highest Common Factor
	Application 1	What is the HCF of 33 and 30?	
	Application 2	What is the HCF of 66 and 69?	

#	Type	Question	Answer
6	Knowledge	What is the definition of a multiple?	A number in another number's times table.
	Application 1	Give an example of a multiple of 9	
	Application 2	Give an example of a multiple of 15	
7	Knowledge	What does the word product mean?	The result of a multiplication.
	Application 1	What is the product of 10 and 9?	
	Application 2	What is the product of 1 and 15?	
8	Knowledge	What is the definition of a prime number?	A number with only 2 factors.
	Application 1	Is the number 1 prime?	
	Application 2	Is the number 16 prime?	
9	Knowledge	What is the definition of a factor?	A number which divides another number exactly.
	Application 1	Give an example of a factor of 3	
	Application 2	Give an example of a factor of 112	
10	Knowledge	What sign would the product of a positive and a negative number have?	Negative
	Application 1	What is the product of 10 and -10?	
	Application 2	What is the product of 15 and -10?	

Careers in Maths

Intelligence Officer

Intelligence officers collect and analyse intelligence and information in support of their country's law enforcement, national security, military, and foreign policy objectives.

You'll work in an office but you'll also travel to meetings or court hearings. If you're working undercover, your place of work may change frequently. You'll look at patterns of criminal activity and how they're linked so that you can provide information on:

- reducing future offending
- targeting individuals and their networks
- tackling trends in particular crimes, for example fraud, drug smuggling, terrorism, or vehicle theft

Your day-to-day tasks may include:

- collecting national and international data
- analysing data using specialist software
- building a picture of crime in an area by studying trends in data
- monitoring the behaviour of individuals or groups
- updating intelligence records on databases
- reviewing the effectiveness of your analysis

Working Hours and Environment

You'll usually work 37 to 40 hours a week. You may have to work extra hours at short notice, especially during times of crisis.

You'll need to be prepared for the fact that you won't be able to talk about your work or post about it on social media. In some roles, you may not be able to reveal who your employer is.

Entry Requirements

You'll usually need:

- to be at least 18
- to have an undergraduate (bachelor's) degree, normally at 2:2 or above
- to be a citizen in the country in which you'll be working, and have lived there for a minimum amount of time (this is 10 years in the UK)
- to pass security checks and criminal background checks

Skills Required:

You'll need:

- the ability to pay attention to detail, as you'll be looking closely at lots of information
- problem solving skills, so you can understand complex data
- good critical thinking skills, to help you question information rather than making assumptions
- to be adaptable, as you may need to quickly change location or work at short notice
- excellent digital literacy skills for using databases and spreadsheets
- to be naturally inquisitive and want to find out more about a person, crime, or situation

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