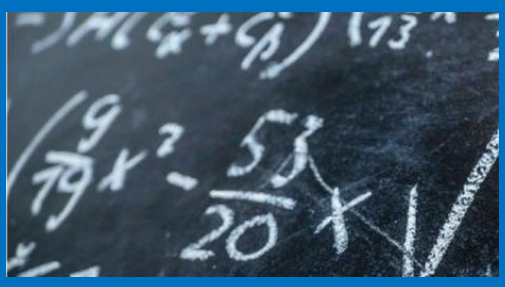
THE DUSTON SCHOOL
Knowledge itself is power
TDS 4-19

Year 8 Maths
Knowledge Organiser
Term 5

Name:	Class:

Keyword	Definition
Median	The middle number in an ordered list.
Range	The difference between the smallest and largest values in a data set.
Mean	The sum of all the data divided by how many data there are.
Mode	The most common piece of data.
Average	An indication of the typical value.
Qualitative	Data which is non-numerical.
Quantitative	Data which is numerical.
Discrete	Data which can only take certain values in a range.
Continuous	Data which can take any value in a range.
Frequency	How often something happens
Grid	A set of horizontal and vertical lines.

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



Term 5 Overview

Big Questions for the term

Sequences, functions and graphs

- What types of sequences are there?
- How can algebra help us with formulating nth term?
- How can we describe position and lines on graphs?
- How does a table of values help me with plotting graphs?
- What is and how can we work out the gradient?
- How can we work out the equation of a straight line?

Data

- How does finding an average help us to interpret and compare data?
- What is a pie chart and how does it link to fractions and proportion?
- What are the benefits of using a stem and leaf diagram to display data?
- What is the best way to find an average when dealing with a lot of data?
- How can a scatter graph be used to predict?

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 (%)

Unit 6 – Area, perimeter and volume

#	Question	Answer
1	State the properties of a square.	4 edges, all equal length, 4 right angles.
2	State the two properties of a trapezium.	Quadrilateral with one pair of parallel edges
3	What is a vertex?	A point where edges meet
4	State the properties of a parallelogram.	Quadrilateral with 2 pairs of parallel edges.
5	What is the formula for calculating the area of a rectangle?	Area = base × height
6	How do you work out the perimeter of a 2D shape?	Add all the edge lengths
7	What is the formula for calculating the area of a triangle?	1/2 x base x height
8	How do you work out the height of a rectangle if you know the area and the base length?	Area ÷ Base length
9	What is the formula for calculating the area of a trapezium?	Area = ½ × (a+b) × height
10	What is the formula for working out the area of a parallelogram?	Area = base × height
11	What are the properties of a rectangle?	Quadrilateral with 2 pairs of parallel edges and 4 right angles.
12	What is the formula for working out the area of a square?	Area = $base^2$
13	How do you work out the height of a triangle if you know the area and the base length?	2 x Area ÷ Base length

Unit 7 – Sequences, functions and graphs

None.

Unit 8 – Data

None.

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 =

Unit 5 – Forming and solving equations

#	Question	Answer
1	How do you solve an equation with an unknown on one side?	Undo each of the parts of the equation, in reverse BIDMAS order.
2	How do you solve an equation with an unknown on both sides?	Simplify, by subtracting the smaller of the two terms containing the unknown, then proceed as normal.
3	What does it mean to "solve an equation"?	Find the value or values of the unknown which make the equation correct.
4	What do you do if you have brackets in your equations?	If you only have one letter, proceed as normal. If you have more than one letter, expand and simplify, then proceed as normal.
5	How do you rearrange an equation so that x is the subject?	Treat it as if you were solving for x, but your answer will be algebraic.
6	What does it mean to "form an equation"?	Write the sentence as an equation, you may need to remember a formula first.

Unit 6 – Area, perimeter and volume

#	Question	Answer
1	What is the formula for calculating the area of a circle?	Area $= \pi \times \text{radius}^2$
2	What is the formula for calculating the circumference of a circle?	Circumference $= \pi$ x diameter
3	How do you work out the surface area of a shape?	Work out the area of each face and add them together.
4	What is the relationship between radius and diameter?	Diameter $= 2 \times$ radius
5	What is the formula for the volume of a prism?	Volume = Cross-sectional Area × Length
6	How do you work out the surface area of a prism?	Surface Area = Cross-sectional Area × 2 + Cross-sectional Perimeter × Length
7	What is the difference between a face, an edge, and a vertex?	A face is a flat surface on a 3D shape, an edge is where two faces meet, a vertex is where edges meet.

Unit 7 – Sequences, functions and graphs

#	Question	Answer
1	How do you find the nth term of a linear sequence?	Identify the term-to-term rule, then work out what you have to add/subtract to get to the first term.
2	How do you work out the equation of a horizontal or vertical line?	Identify the number where the line goes through the axis, a. If horizontal: $y = a$. If vertical: $x = a$.
3	How do you find the value of any term using the nth term rule?	Substitute the number of the term into the nth term rule.
4	How do you work out the gradient of a line?	Choose 2 points on the line, then divide the change in y by the change in x.
5	What do the letters m and c represent in $y = mx + c$?	m = gradient, c = y-intercept
6	How do you find the equation of a line given two points on it?	Find the gradient. Substitute the gradient and the (x,y) of one of the points into $y = mx + c$ and solve for c.
7	How do you know, given the equations of two lines, if they are parallel?	They have the same gradient.
8	How do you find the midpoint given two points?	The midpoint will have coordinates halfway between the x and y coordinates of the two given points.

Unit 8 – Data

#	Question	Answer
1	How do you find the mode from a frequency table?	Identify the most frequent one.
2	How do you find the median from a frequency table?	Find the total frequency, add one and halve it. Identify which class contains that piece of data.
3	How do you find the mean from a frequency table?	Multiply Across, Add Down, Divide Totals.
4	How do you find the mean from a grouped frequency table?	Find Midpoints, Multiply Across, Add Down, Divide Totals.
5	How do you find interquartile range?	Upper Quartile - Lower Quartile
6	How do you find the lower quartile?	Add one to the number of values, divide by 4. Find the value in this position.
7	How do you find the upper quartile?	Add one to the number of values, multiply by 3, divide by 4. Find the value in this position.
8	What statistics are on a box plot?	Lowest Value, Lower Quartile, Median, Upper Quartile, Highest Value.

Term 5 - Homework 1

#	Type	Question	Answer
1	Knowledge	How do you expand double brackets?	
	Application 1	Expand $(z + 2)(z + 2)$	
	Application 2	Expand $(r + 4)(r + 4)$	
2	Knowledge	Which operation do we use for the word 'of'?	
	Application 1	Write the calculation for 'Two thirds of 48'	
	Application 2	Write the calculation for 'Seven twelfths of 72'	
3	Knowledge	How do you determine the index when converting large numbers into standard form?	
	Application 1	What is the index when the number 8350000 is written in standard form?	
	Application 2	What is the index when the number 235000000 is written in standard form?	
4	Knowledge	What does HCF stand for?	
	Application 1	What is the HCF of 18 and 30?	
	Application 2	What is the HCF of 66 and 60?	
5	Knowledge	How do you divide a number by 10?	
	Application 1	Calculate 69 divided by 10.	
	Application 2	Calculate 160 divided by 10.	

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#	Type	Question	Answer
6	Knowledge	How do you find the range of a set of data?	
	Application 1	What is the range of the following data: 19, 17, 14, 14, 13	
	Application 2	What is the range of the following data: 16, 11, 20, 17, 19	
7	Knowledge	How do you simplify fractions?	
	Application 1	Fully simplify 6/12	
	Application 2	Fully simplify 16/30	
8	Knowledge	With a calculator, how do you convert a percentage to a fraction?	
	Application 1	Convert 82% into a fraction.	
	Application 2	Convert 35% into a fraction.	
9	Knowledge	How do you add decimals?	
	Application 1	Calculate 9.5 + 6.9	
	Application 2	Calculate 15.7 + 16	
10	Knowledge	With a calculator, how do you convert a percentage to a decimal?	
	Application 1	Convert 95% into a decimal.	
	Application 2	Convert 69% into a decimal.	

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

12	Knowledge	What is a cube number?	
	Application 1	What is 4 cubed?	
	Application 2	What is 7 cubed?	

13	Knowledge	What does the word sum mean?	
	Application 1	What is the sum of 8 and 6?	
	Application 2	What is the sum of 3 and 6?	

14	Knowledge	How do you find the median when you have an even number of pieces of data?	
	Application 1	What is the median of the following data: 17, 15, 16, 17, 18, 10	
	Application 2	What is the median of the following data: 15, 17, 13, 17, 11, 13	

15	Knowledge	What does percent mean?	
	Application 1	Write 45% as a fraction.	
	Application 2	Write 178% as a fraction.	

Workings Space

Term 5 - Homework 2

#	Type	Question	Answer
1	Knowledge	How do you add decimals?	
	Application 1	Calculate 3.5 + 5.9	
	Application 2	Calculate 16.9 + 12.6	
2	Knowledge	How do you determine the index when converting large numbers into standard form?	
	Application 1	What is the index when the number 34200 is written in standard form?	
	Application 2	What is the index when the number 8290000 is written in standard form?	
3	Knowledge	How do you convert a fraction to a decimal if the denominator is a factor of 100?	
	Application 1	What is 4/25 as a decimal?	
	Application 2	What is 2/200 as a decimal?	
4	Knowledge	In algebra, what is substitution?	
	Application 1	Evaluate 3x + 2y, if x = 2 and y = 5	
	Application 2	Evaluate 7x + 6y, if x = 7 and y = 3	
5	Knowledge	How do you find the range of a set of data?	
	Application 1	What is the range of the following data: 15, 11, 14, 16, 14	
	Application 2	What is the range of the following data: 10, 18, 14, 15, 10	

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#	Type	Question	Answer
6	Knowledge	What does consecutive mean?	
	Application 1	Select 2 of these numbers which are consecutive: 9, 14, 10, 17.	
	Application 2	Select 2 of these numbers which are consecutive: 4, 9, 6, 8.	
7	Knowledge	Which operation do we use for the word 'of'?	
	Application 1	Write the calculation for 'Two thirds of 18'	
	Application 2	Write the calculation for 'Seven twelfths of 84'	
8	Knowledge	How do you find the median when you have an odd number of pieces of data?	
	Application 1	What is the median of the following data: 15, 11, 14, 16, 14	
	Application 2	What is the median of the following data: 10, 18, 14, 15, 10	
9	Knowledge	How do you simplify a power raised to another power?	
	Application 1	Simplify $(18^3)^5$	
	Application 2	Simplify $(17^6)^3$	
10	Knowledge	How do you convert a decimal to a fraction?	
	Application 1	Write 0.15 as a fraction.	
	Application 2	Write 0.181 as a fraction.	

#	Type	Question	Answer
11	Knowledge	What's the first step when adding or subtracting fractions?	
	Application 1	Complete the first step of the calculation 2/10 + 2/5	
	Application 2	Complete the first step of the calculation 6/9 + 7/6	
12	Knowledge	How do you find a fraction of an amount?	
	Application 1	Find 9/11 of 99	
	Application 2	Find 8/12 of 48	
13	Knowledge	How do you simplify the product of two powers with the same base?	
	Application 1	Simplify $10^6 \times 10^6$	
	Application 2	Simplify $13^4 \times 13^3$	
14	Knowledge	How do you expand single brackets?	
	Application 1	Expand 3(4u - 8)	
	Application 2	Expand 4p(2p - 9)	
15	Knowledge	In algebra, what does "collecting like terms" mean?	
	Application 1	Simplify the following expression: 10p + 3q - 2p + 2q	
	Application 2	Simplify the following expression: 7p + 7q - 6p + 7q	

Workings Space

Term 5 - Homework 3

#	Type	Question	Answer
1	Knowledge	How do you simplify fractions?	
	Application 1	Fully simplify 14/12	
	Application 2	Fully simplify 20/24	
2	Knowledge	What are decimal places?	
	Application 1	How many decimal places does the number 0.09660 have?	
	Application 2	How many decimal places does the number 0.0748 have?	
3	Knowledge	How do you find the median when you have an even number of pieces of data?	
	Application 1	What is the median of the following data: 12, 13, 12, 12, 14, 14	
	Application 2	What is the median of the following data: 12, 16, 14, 15, 13, 15	
4	Knowledge	What is the answer to any number raised to the power zero?	
	Application 1	Evaluate 12^0	
	Application 2	Evaluate 15^0	
5	Knowledge	What is the definition of a multiple?	
	Application 1	Give an example of a multiple of 8	
	Application 2	Give an example of a multiple of 5	

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#	Type	Question	Answer
6	Knowledge	What is the first step when trying to find the next term in a sequence?	
	Application 1	What is the next term in the following sequence 4, 13, 22, 31, 40?	
	Application 2	What is the next term in the following sequence 8, 11, 14, 17, 20?	
7	Knowledge	How is a negative index related to the same positive index?	
	Application 1	Write 5^{-6} using a positive index	
	Application 2	Write 5^{-5} using a positive index	
8	Knowledge	How do you convert a percentage to a decimal?	
	Application 1	Write 45% as a decimal.	
	Application 2	Write 159% as a decimal.	
9	Knowledge	What is a numerator?	
	Application 1	What is the numerator in the fraction 4 tenths?	
	Application 2	What is the numerator in the fraction 2 sixths?	
10	Knowledge	With a calculator, how do you convert a percentage to a fraction?	
	Application 1	Convert 20% into a fraction.	
	Application 2	Convert 45% into a fraction.	

#	Type	Question	Answer
11	Knowledge	How do you divide a number by 10?	
	Application 1	Calculate 66 divided by 10.	
	Application 2	Calculate 135 divided by 10.	
12	Knowledge	How do you find a fraction of an amount?	
	Application 1	Find 9/11 of 44	
	Application 2	Find 8/11 of 88	
13	Knowledge	What does the word product mean?	
	Application 1	What is the product of 2 and 8?	
	Application 2	What is the product of 4 and 5?	
14	Knowledge	How is division represented algebraically?	
	Application 1	How do you write b divided by 2 algebraically?	
	Application 2	How do you write 4 divided by c algebraically?	
15	Knowledge	How do you multiply fractions?	
	Application 1	Calculate 9/180 × 5/90	
	Application 2	Calculate 3/40 × 8/40	

Workings Space