

Year 9 Higher 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 nu the decimal fraction are separated by a decimal poin		
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 2 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.	



Term 1 Overview

Big Questions for the term

Calculations and Accuracy

- How do we perform multiplication and division with decimals?
- How do we perform calculations involving negative values?
- How do we represent inequalities?
- How can we represent a number that has been rounded?
- What is the difference between decimals places and significant figures?

Integers, Powers and Roots

- How can we work out Highest Common Factor and Lowest Common Multiple
- What are the different index laws?
- How do we convert between ordinary and standard form numbers?
- How do we do calculations with standard form numbers
- What is a surd?

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	
10		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	

<u>Unit 2 – Integers, Powers and Roots</u>

#	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.

Unit 1 – Calculations and Accuracy

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

#	Question	Answer
1	What is a significant figure?	Any digit after the first non-zero digit
2	How do you round to 3 significant figures?	Look at the 4th significant figure, if less than 5 - round down, if 5 or more - round up
3	How do you estimate the answer to a calculation?	Round the numbers to 1 significant figure and calculate
4	What is the difference between an empty circle and a filled in circle on a number line inequality?	The filled in circle includes "or equal to" whereas the empty one does not

<u>Unit 2 – Integers, Powers and Roots</u>

#	Question	Answer
1	How do you simplify the product of two powers with the same base?	Keep the base the same and add the indices.
2	How do you simplify the division of two powers with the same base?	Keep the base the same and subtract the second index from the first.
3	What does a fractional power represent?	A root
4	How do you multiply numbers in standard form?	Multiply the numbers, add the indices, adjust if necessary
5	How do you divide numbers in standard form?	Divide the numbers, subtract the indices, adjust if necessary
6	How do you simplify surds?	Separate out any square number factors

Term 1 Homework 1 – Calculations and Accuracy Years 7 and 8

#	Туре	Question	Answer
1	Knowledge	How do you round to 2 decimal places?	
	Application 1	Round the number 16.7844 to 2 decimal places	
	Application 2	Round the number 37.6495 to 2 decimal places	

	Knowledge	How do you find the median when you have an odd number of pieces of data?	
2	Application 1	What is the median of the following data: 17, 17, 11, 14, 14	
	Application 2	What is the median of the following data: 20, 13, 19, 10, 17	

3	Knowledge	How do you work out the value of a digit in a long number?	
	Application 1	What is the value of the 3 in the number 42367?	
	Application 2	What is the value of the 5 in the number 85496?	

	Knowledge	How do you multiply a number by 10?	
4	Application 1	Evaluate 74 multiplied by 10.	
	Application 2	Evaluate 167 multiplied by 10.	

	Knowledge	What is a linear sequence?	
5	Application 1	Is the following sequence linear? 3, 5, 8, 10	
	Application 2	Is the following sequence linear? 22, 45, 70, 93	

#	Туре	Question	Answer
6	Knowledge	What does consecutive mean?	
	Application 1	Select 2 of these numbers which are consecutive: 8, 13, 9, 16.	
	Application 2	Select 2 of these numbers which are consecutive: 12, 17, 14, 16.	

	Knowledge	What does the word sum mean?	
7	Application 1	What is the sum of 8 and 5?	
	Application 2	What is the sum of 12 and 12?	

	Knowledge	How do you find the difference between two numbers?	
8	Application 1	What is the difference between 45 and 74?	
	Application 2	What is the difference between 149 and 167?	

	Knowledge	How do you find the median when you have an even number of pieces of data?	
9	Application 1	What is the median of the following data: 14, 19, 16, 14, 17, 20	
	Application 2	What is the median of the following data: 13, 18, 18, 20, 15, 11	

	Knowledge	What is subtracting a negative number equivalent to?	
10	Application 1	Calculate 8 - (-1)	
	Application 2	Calculate 12 - (-17)	

#	Туре	Question	Answer
11	Knowledge	How do you find the range of a set of data?	
	Application 1	What is the range of the following data: 17, 17, 11, 14, 14	
	Application 2	What is the range of the following data: 20, 13, 19, 10, 17	

	Knowledge	How do you use a calculation to work out the answer to another calculation with the same digits?	
12	Application 1	Given that 3230 × 152 = 490960, what is 32.3 × 152000	
	Application 2	Given that 9730 × 859 = 8358070, what is 97.3 × 8590	

	Knowledge	What should your answer be if the question tells you to calculate?	
13	Application 1	Calculate 5 multiplied by 7	
	Application 2	Calculate 17 multiplied by 2	

	Knowledge	What is a term-to-term rule?	
14	Application 1	What is the term-to-term rule in the following sequence 8, 13, 18, 23, 28?	
	Application 2	What is the term-to-term rule in the following sequence 12, 24, 36, 48, 60?	

	Knowledge	What is the first step when trying to find the next term in a sequence?	
15	Application 1	What is the next term in the following sequence 8, 13, 18, 23, 28?	
	Application 2	What is the next term in the following sequence 12, 24, 36, 48, 60?	

Workings Space

Term 1 Homework 2 – Calculations and Accuracy Years 8 and 9

#	Туре	Question	Answer
1	Knowledge	What is a significant figure?	
	Application 1	How many significant figures does the number 3.06593 have?	
	Application 2	How many significant figures does the number 0.00483 have?	

	Knowledge	How do you use a calculation to work out the answer to another calculation with the same digits?	
2	Application 1	Given that 9750 × 874 = 8521500, what is 97.5 × 87.4	
	Application 2	Given that 1790 × 342 = 612180, what is 1.79 × 34200	

	Knowledge	How do you divide by a decimal?	
3	Application 1	Calculate 0.168 divided by 0.008	
	Application 2	Calculate 0.0224 divided by 0.0008	

4	Knowledge	How do you find the range of a set of data?	
	Application 1	What is the range of the following data: 16, 18, 20, 20, 16	
	Application 2	What is the range of the following data: 19, 20, 18, 17, 16	

5	Knowledge	What is the difference between an empty circle and a filled in circle on a number line inequality?	
	Application 1	Draw a number line to represent the inequality x ≤ 1	
	Application 2	Draw a number line to represent the inequality x < 0	

#	Туре	Question	Answer
6	Knowledge	How do you estimate the answer to a calculation?	
	Application 1	Estimate the answer to 291 × 18840	
	Application 2	Estimate the answer to 618 × 1618	

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7	Knowledge	What are decimal places?	
	Application 1	How many decimal places does the number 0.0926 have?	
	Application 2	How many decimal places does the number 0.0713 have?	

8	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: 15, 14, 14, 16, 17, 12	
	Application 2	What is the median of the following data: 13, 19, 13, 19, 16, 18	

	Knowledge	How do you find the median when you have an odd number of pieces of data?	
9	Application 1	What is the median of the following data: 16, 18, 20, 20, 16	
	Application 2	What is the median of the following data: 19, 20, 18, 17, 16	

10	Knowledge	How do you round to 3 significant figures?	
	Application 1	Round the number 1.71544 to 3 significant figures	
	Application 2	Round the number 5.44229 to 3 significant figures	

Workings Space

Term 1 Homework 3 – Integers, Powers and Roots Years 7 and 8

#	Туре	Question	Answer
1	Knowledge	How do you estimate a square root?	
	Application 1	Between which two integers is the square root of 137?	
	Application 2	Between which two integers is the square root of 62?	

	Knowledge	What is the definition of a prime number?	
2	Application 1	Is the number 7 prime?	
	Application 2	Is the number 13 prime?	

	Knowledge	The first part of a number written in standard from should be between which 2 numbers?
3	Application 1	What is the initial number when 0.00000836 is written in standard form?
	Application 2	What is the initial number when 30.5 is written in standard form?

	Knowledge	List the first 15 square numbers.	
4	Application 1	What is the 4th square number?	
	Application 2	What is the 16th square number?	

	Knowledge	What sign would the product of 2 negative numbers have?	
5	Application 1	What is the product of -8 and -6?	
	Application 2	What is the product of -18 and -10?	

#	Туре	Question	Answer
6	Knowledge	What sign would the product of a positive and a negative number have?	
	Application 1	What is the product of 10 and -6?	
	Application 2	What is the product of 11 and -6?	

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	Knowledge	How do you determine the index
	Knowledge	into standard form?
	Application	What is the index when the
7	1	number 98800000 is written in
		standard form?
	Application	What is the index when the
	7 2	number 377000 is written in
	2	standard form?

	Knowledge	What is the answer to any number raised to the power zero?	
8	Application 1	Evaluate 17 ⁰	
	Application 2	Evaluate 13 ⁰	

	Knowledge	How do you simplify the division of two powers with the same base?	
9	Application 1	Simplify 13 ⁵ × 13 ³	
	Application 2	Simplify 18 ⁴ × 18 ³	

	Knowledge	What sign would the answer to a negative number divided by a positive number have?	
10	Application 1	Calculate -60 divided by 6	
	Application 2	Calculate -209 divided by 19	

#	Туре	Question	Answer
	Knowledge	What does the word product mean?	
11	Application 1	What is the product of 10 and 8?	
	Application 2	What is the product of 7 and 18?	

	Knowledge	What does HCF stand for?	
12	Application 1	What is the HCF of 10 and 11?	
	Application 2	What is the HCF of 66 and 60?	

	Knowledge	How do you simplify the product of two powers with the same base?	
13	Application 1	Simplify 15 ³ × 15 ³	
	Application 2	Simplify 14 ³ × 14 ⁴	

	Knowledge	What is a cube number?	
14	Application 1	What is 2 cubed?	
	Application 2	What is 9 cubed?	

	Knowledge	What is the definition of a multiple?	
15	Application 1	Give an example of a multiple of 8	
	Application 2	Give an example of a multiple of 18	

Workings Space