

Year 9 Higher Maths

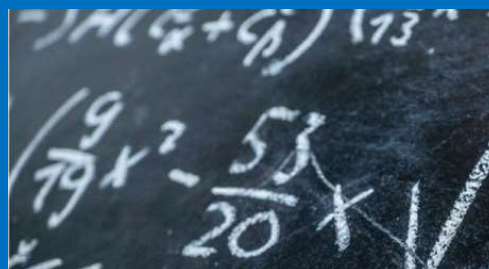
Knowledge Organiser

Term 1

Name:	Class:
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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 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.

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 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?

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 form should be between which 2 numbers?	1 and 10 (smaller than 10...)

Knowledge Retrieval Questions – From Year 9

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

Unit 2 – Integers, Powers and Roots

#	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

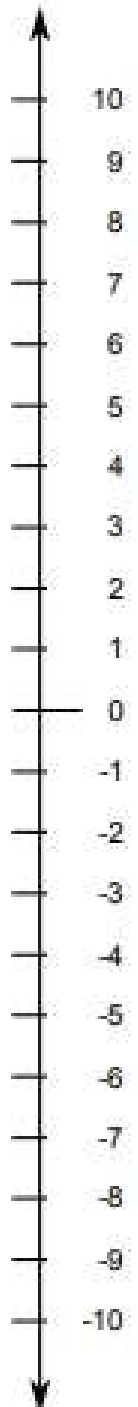
Significant figures are each of the digits in a number that are used to express it to the required degree of accuracy.

- Non-zero digits are always significant.
- Any zeros located between non-zero digits are significant.
- Trailing zeros are only significant if a decimal point is present.

Example



Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths	ten thousandths	hundred thousandths
HTH	TTh	Th	H	T	0	.	t	h	th	tth	hth
100,000	10,000	1,000	100	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$
Whole Number Part						Decimal Point	Fractional Part				



MathsWatch

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 – Calculations and Accuracy Years 7 and 8

#	Type	Question	Answer
1	Knowledge	How do you round to 2 decimal places?	Look at the 3rd decimal place, if less than 5 - round the second decimal place down, if 5 or more - round up
	Application 1	Round the number 16.7844 to 2 decimal places	
	Application 2	Round the number 37.6495 to 2 decimal places	

2	Knowledge	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
	Application 1	What is the median of the data: 17, 17, 11, 14, 14	
	Application 2	What is the median of the data 20, 13, 19, 10, 17	

3	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 3 in the number 42367?	
	Application 2	What is the value of the 5 in the number 85496?	

4	Knowledge	How do you multiply a number by 10?	Move all the digits 1 place to the left
	Application 1	Evaluate 74 multiplied by 10.	
	Application 2	Evaluate 167 multiplied by 10.	

5	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? 3, 5, 8, 10	
	Application 2	Is the following sequence linear? 22, 45, 70, 93	

#	Type	Question	Answer
6	Knowledge	What does consecutive mean?	Following each other continuously.
	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.	

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

8	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 45 and 74?	
	Application 2	What is the difference between 149 and 167?	

9	Knowledge	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
	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	

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

#	Type	Question	Answer
11	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: 17, 17, 11, 14, 14	
	Application 2	What is the range of the following data: 20, 13, 19, 10, 17	

12	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 $3230 \times 152 = 490960$, what is 32.3×152000	
	Application 2	Given that $9730 \times 859 = 8358070$, what is 97.3×8590	

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

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

15	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 following sequence 8, 13, 18, 23, 28?	
	Application 2	What is the next term in the following sequence 12, 24, 36, 48, 60?	

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

#	Type	Question	Answer
1	Knowledge	What is a significant figure?	Any digit after the first non-zero digit
	Application 1	How many significant figures does the number 3.06593 have?	
	Application 2	How many significant figures does the number 0.00483 have?	

2	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 $9750 \times 874 = 8521500$, what is 97.5×87.4	
	Application 2	Given that $1790 \times 342 = 612180$, what is 1.79×34200	

3	Knowledge	How do you divide by a decimal?	Multiply both numbers by 10 repeatedly until you are dividing by a whole number
	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?	Largest number - Smallest number
	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?	The filled in circle includes "or equal to" whereas the empty one does not
	Application 1	Draw a number line to represent the inequality $x \leq 1$	
	Application 2	Draw a number line to represent the inequality $x < 0$	

#	Type	Question	Answer
6	Knowledge	How do you estimate the answer to a calculation?	Round the numbers to 1 significant figure and calculate
	Application 1	Estimate the answer to $291 + 18840$	
	Application 2	Estimate the answer to 618×1618	

7	Knowledge	What are decimal places?	Digits to the right of a decimal point
	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?	Put the numbers in order and find the mean of the two middle numbers
	Application 1	What is the median of the data: 15, 14, 14, 16, 17, 12	
	Application 2	What is the median of the data: 13, 19, 13, 19, 16, 18	

9	Knowledge	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
	Application 1	What is the median of the data: 16, 18, 20, 20, 16	
	Application 2	What is the median of the data: 19, 20, 18, 17, 16	

10	Knowledge	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
	Application 1	Round the number 1.71544 to 3 significant figures	
	Application 2	Round the number 5.44229 to 3 significant figures	

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

#	Type	Question	Answer
1	Knowledge	How do you estimate a square root?	Identify the square numbers either side of it
	Application 1	Between which two integers is the square root of 137?	
	Application 2	Between which two integers is the square root of 62?	

2	Knowledge	What is the definition of a prime number?	A number with only 2 factors.
	Application 1	Is the number 7 prime?	
	Application 2	Is the number 13 prime?	

3	Knowledge	The first part of a number written in standard form should be between which 2 numbers?	1 and 10 (smaller than 10...)
	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?	

4	Knowledge	List the first 15 square numbers.	1,4,9,16,25,36,49,64,81,100,121,144,169,196,225
	Application 1	What is the 4th square number?	
	Application 2	What is the 16th square number?	

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

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

7	Knowledge	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
	Application 1	What is 90000 in standard form?	
	Application 2	What is 94500 in standard form?	

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

9	Knowledge	How do you simplify the division of two powers with the same base?	Subtract the second index from the first, keep the base number the same
	Application 1	Simplify $13^5 \div 13^3$	
	Application 2	Simplify $18^4 \div 18^3$	

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

#	Type	Question	Answer
11	Knowledge	What does the word product mean?	The result of a multiplication.
	Application 1	What is the product of 10 and 8?	
	Application 2	What is the product of 7 and 18?	

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

13	Knowledge	How do you simplify the product of two powers with the same base?	Add the indices together, keep the base number the same
	Application 1	Simplify $15^3 \times 15^3$	
	Application 2	Simplify $14^3 \times 14^4$	

14	Knowledge	What is a cube number?	The product of 3 equal numbers.
	Application 1	What is 2 cubed?	
	Application 2	What is 9 cubed?	

15	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 8	
	Application 2	Give an example of a multiple of 18	



Software Developer

Software developers design, build, and test software. It's a career that's often confused with web developer.

Software developers have a *wide* scope and work on different types of software that can run without a website. They might, for example, write code for a phone app, a word processor, a web browser like Chrome, or the operating system for a smart TV.

As a software developer, your day-to-day tasks will include:

- talking through requirements with the client and the rest of the development team
- taking part in technical design and progress meetings
- writing and amending computer code
- testing software and fixing problems
- keeping records of the development process, changes, and results
- carrying out trials and quality checks before release

Working Hours and Environment

You'll usually work 37 to 40 hours a week, Monday to Friday. Some evening or weekend work may be needed to meet deadlines.

Wherever you work, you'll spend a lot of time sat down in front of a computer. You'll also have regular meetings to speak with team members, whether in person or online.

Skills Required:

You'll need:

- digital literacy and technical skills, including a strong knowledge of computer systems and programming languages
- problem-solving and numeracy skills
- communication skills, to explain complex issues to team members and clients
- attention to detail
- learning skills, to help stay on top of the latest developments in your field

Entry Requirements

There aren't any formal requirements for becoming a software developer – your skills and experience are more important. However, it may help to complete an apprenticeship or degree in a relevant subject like:

- computer science
- computer software
- computer systems engineering
- computer programming

It'll help to be familiar with at least one of these programming languages:

- Python
- Java
- C#

