

# Year 9 Foundation Maths

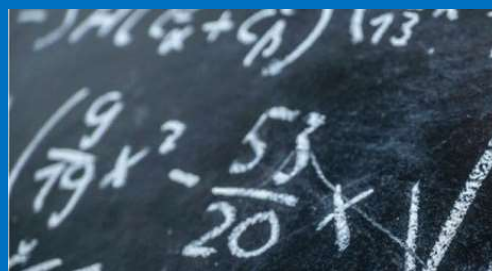
## Knowledge Organiser

### Term 2

<b>Name:</b>	<b>Class:</b>
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Keyword	Definition
Ratio	Shows the relative sizes of two or more values.
Proportion	The relationship compared to the whole.
Equivalent	Equal to the same amount.
Simplifying	With fractions and ratio, simplifying is finding the equivalent fraction or ratio with the smallest numbers.
Direct Proportion	A relationship between 2 variables, the ratio between them is always constant.
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.

<b>Homework 1 due:</b>	
<b>Homework 2 due:</b>	
<b>Homework 3 due:</b>	





## 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

#### Ratio and proportion

- What are the different types of ratio questions?
- What is unitary ratio?
- What is direct proportion?
- What is inverse proportion?
- What does it mean for shapes to be similar?
- How do we convert measures for area and volume?

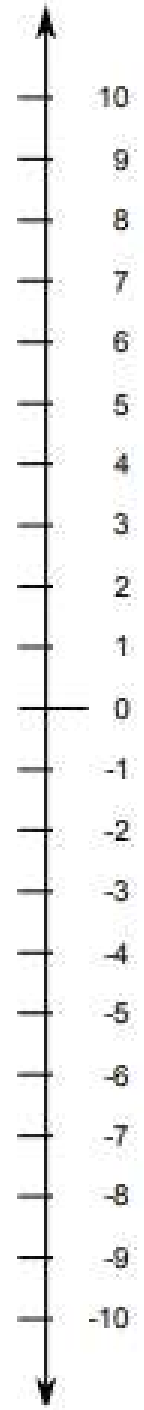
#### Fractions, decimals and percentages

- How do we represent fractions?
- How do we perform operations with fractions?
- How do we convert between fractions, decimals and percentages?
- How do we work out fractions of amounts?
- How do we work out percentages of amounts?
- What is a decimal multiplier?
- How do we work out percentage change?

# 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

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths	ten thousandths	hundred thousandths
HTH	TTh	Th	H	T	O	.	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](http://vle.mathswatch.co.uk)

Username: firstnamesurname@dustonschool

Password: berrywood

## Knowledge Retrieval Questions – From Year 7

### Unit 3 – Ratio and Proportion

#	Question	Answer
1	How do you simplify a ratio?	Divide both numbers by a common factor.
2	How do you write a ratio into the form 1:n?	Divide both numbers in the ratio by the first number in the ratio.
3	What is the unitary method?	A method where the first step is making the ratio 1:n or n:1
4	How do you calculate best value?	Work out the cost of the same amount for each option and compare those.
5	How do you share an amount in a ratio?	Add the ratio numbers and divide by that to get the value of each part.

### 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 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 =

## Knowledge Retrieval Questions – For Year 9

### Unit 3 – Ratio and proportion

#	Question	Answer
1	How do you share in a ratio if you are given the difference?	Work out the difference in the ratio and scale up to the difference you want
2	How do you share in a ratio if you are given one of the final amounts?	Scale up from the ratio to the amount you know and apply to the other
3	How do you use exchange rates to convert money?	Scale up the currency you know and apply to the other
4	What is direct proportion?	Describes quantities which have a constant ratio
5	What is indirect proportion?	Describes quantities which have a constant product
6	What is a scale factor?	The ratio between corresponding measurements of similar shapes

### Unit 4 – Fractions, decimals and percentages

#	Question	Answer
1	How do you increase an amount by a percentage?	Calculate the percentage of the amount, then add it on to the original amount
2	How do you decrease an amount by a percentage?	Calculate the percentage of the amount, then subtract it from the original amount
3	With a calculator, how do you increase an amount by a percentage?	Add the percentage to 100%, then multiply by the amount
4	With a calculator, how do you decrease an amount by a percentage?	Subtract the percentage from 100%, then multiply by the amount
5	How do you work out the value after adding simple interest?	amount + % of amount × number of years
6	How do you work out percentage change?	(Change ÷ Original) × 100 (%)

## Term 2 - Homework 1

#	Type	Question	Answer
1	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 before the decimal point
	Application 1	What is the index when the number 493 000 000 is written in standard form?	
	Application 2	What is the index when the number 839 000 is written in standard form?	

2	Knowledge	What sign would the product of a positive and a negative number have?	Negative
	Application 1	What is the product of 9 and -4?	
	Application 2	What is the product of 5 and -4?	

3	Knowledge	How do you multiply numbers in standard form?	Multiply the numbers, add the indices, adjust if necessary
	Application 1	Calculate, giving your answer in standard form, $(3 \times 10^0) \times (2 \times 10^5)$	
	Application 2	Calculate, giving your answer in standard form, $(2 \times 10^9) \times (2 \times 10^2)$	

4	Knowledge	What is a cube number?	The product of 3 equal numbers.
	Application 1	What is 5 cubed?	
	Application 2	What is 2 cubed?	

5	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 9th square number?	
	Application 2	What is the 12th square number?	

6	Knowledge	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
	Application 1	What is the index when the number 0.00 000 549 is written in standard form?	
	Application 2	What is the index when the number 0.0039 is written in standard form?	

7	Knowledge	What is the definition of a factor?	A number which divides another number exactly.
	Application 1	Give an example of a factor of 9	
	Application 2	Give an example of a factor of 35	

8	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 7	
	Application 2	Give an example of a multiple of 3	

10	Knowledge	What sign would the answer to a negative number divided by a positive number have?	Negative
	Application 1	Calculate -36 divided by 4	
	Application 2	Calculate -25 divided by 5	

11	Knowledge	What is the definition of a square number?	The product of a number and itself
	Application 1	What is the 5th square number?	
	Application 2	What is the 16th square number?	

12	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 136?	
	Application 2	Between which two integers is the square root of 58?	

13	Knowledge	What does LCM stand for?	Lowest Common Multiple
	Application 1	What is the LCM of 8 and 5?	
	Application 2	What is the LCM of 10 and 8?	

14	Knowledge	What does HCF stand for?	Highest Common Factor
	Application 1	What is the HCF of 48 and 40?	
	Application 2	What is the HCF of 115 and 115?	

15	Knowledge	What is the answer to any number raised to the power zero?	1
	Application 1	Evaluate $13^0$	
	Application 2	Evaluate $11^0$	

## Term 2 - Homework 2

#	Type	Question	Answer
1	Knowledge	How do you share an amount in a ratio?	Add the ratio numbers and divide by that to get the value of each part.
	Application 1	Share 90 into the ratio 4 : 5	
	Application 2	Share 33 into the ratio 1 : 2	

2	Knowledge	How do you share in a ratio if you are given the difference?	Work out the difference in the ratio and scale up to the difference you want
	Application 1	Anna and Ben share money in the ratio 5:2. Anna gets £42 more than Ben, how much does Anna get?	
	Application 2	Anna and Ben share money in the ratio 7:2. Anna gets £25 more than Ben, how much does Anna get?	

3	Knowledge	What is a scale factor?	The ratio between corresponding measurements of similar shapes
	Application 1	Corresponding sides on two similar shapes are 7cm and 28cm. What is the scale factor?	
	Application 2	Corresponding sides on two similar shapes are 3cm and 9cm. What is the scale factor?	

4	Knowledge	What is the unitary method?	A method where the first step is making the ratio 1: n or n:1
	Application 1	9 pens cost 36p. Work out the cost of 10 pens.	
	Application 2	4 pens cost 16p. Work out the cost of 5 pens.	

5	Knowledge	What does HCF stand for?	Highest Common Factor
	Application 1	What is the HCF of 60 and 40?	
	Application 2	What is the HCF of 8 and 9?	

6	Knowledge	How do you calculate best value?	Work out the cost of the same amount for each option and compare those.
	Application 1	SHOW, which is better value, Shop A: 5 pens for 35p, or Shop B: 7 pens for 42p	
	Application 2	SHOW, which is better value, Shop A: 3 pens for 9p, or Shop B: 5 pens for 20p?	

7	Knowledge	How do you simplify a ratio?	Divide both numbers by a common factor.
	Application 1	Fully simplify 6:30	
	Application 2	Fully simplify 8:18	

8	Knowledge	What is the definition of a square number?	The product of a number and itself
	Application 1	List the first 10 square numbers	
	Application 2	What is the 11th square number?	

9	Knowledge	How do you write a ratio into the form n:1?	Divide both numbers in the ratio by the second number in the ratio.
	Application 1	Write the ratio 9:2 into the form n:1	
	Application 2	Write the ratio 4:10 into the form n:1	

10	Knowledge	How do you use exchange rates to convert money?	Scale up the currency you know and apply to the other
	Application 1	The exchange rate for GBP to USD is 1:2 How many Dollars would get for £70?	
	Application 2	The exchange rate for GBP to USD is 1:3.5 How many Dollars would get for £180?	

11	Knowledge	How do you convert a mixed number to an improper fraction?	Multiply the whole number by the denominator and add it to the numerator
	Application 1	Convert $2\frac{3}{7}$ into an improper fraction.	
	Application 2	Convert $4\frac{4}{5}$ into an improper fraction.	

12	Knowledge	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
	Application 1	What is the index when the number 0.000 789 is written in standard form?	
	Application 2	What is the index when the number 0.000 000 8 is written in standard form?	

**Term 2 - Homework 3**

#	Type	Question	Answer
1	Knowledge	How do you find an equivalent fraction?	Multiply or divide the numerator and denominator by the same number.
	Application 1	State a fraction which is equivalent to $\frac{5}{11}$	
	Application 2	State a fraction which is equivalent to $\frac{2}{7}$	

2	Knowledge	How do you convert a mixed number to an improper fraction?	Multiply the whole number by the denominator and add it to the numerator
	Application 1	Convert $7\frac{3}{7}$ into an improper fraction.	
	Application 2	Convert $3\frac{4}{5}$ into an improper fraction.	

3	Knowledge	What is the unitary method?	A method where the first step is making the ratio 1: n or n:1
	Application 1	10 pens cost 40p. Work out the cost of 7 pens.	
	Application 2	8 pens cost 16p. Work out the cost of 5 pens.	

4	Knowledge	What does percent mean?	Out of 100
	Application 1	Write 29% as a fraction.	
	Application 2	Write 182% as a fraction.	

5	Knowledge	What's the first step when adding or subtracting fractions?	Write the fractions with a common denominator
	Application 1	Complete the first step of the calculation $\frac{1}{8} + \frac{7}{4}$	
	Application 2	Complete the first step of the calculation $\frac{4}{5} + \frac{3}{10}$	

6	Knowledge	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)
	Application 1	What is $\frac{7}{25}$ as a decimal?	
	Application 2	What is $\frac{2}{100}$ as a decimal?	

7	Knowledge	What is a numerator?	Top number in a fraction
	Application 1	What is the numerator in the fraction 8 tenths?	
	Application 2	What is the numerator in the fraction 2 sixths?	

8	Knowledge	How do you work out the value after adding simple interest?	amount + % of amount × number of years
	Application 1	Calculate the balance if an account with £5300 got 3% simple interest for 3 years	Value of 3% → Value of interest after 3 years → Value in the account after 3 years
	Application 2	Calculate the balance if an account with £2600 got 2% simple interest for 4 years.	Value of 2% → Value of interest after 4 years → Value in the account after 4 years →

9	Knowledge	How do you find a fraction of an amount?	Divide the amount by the denominator and multiply by the numerator.
	Application 1	Find $\frac{4}{5}$ of 20	
	Application 2	Find $\frac{3}{7}$ of 49	

10	Knowledge	How do you work out percentage change?	$(\text{Change} \div \text{Original}) \times 100 (\%)$
	Application 1	Over a year, your bank account goes from £7000 to £10200, calculate the percentage change.	_____ × 100 =
	Application 2	Over a year, your bank account goes from £7000 to £8500, calculate the percentage change.	_____ × 100 =

11	Knowledge	How do you increase an amount by 40% without a calculator?	Find 10% by dividing by 10, multiply that by 4, then add the result onto the original amount.
	Application 1	Increase 160 by 40%	
	Application 2	Increase 280 by 40%	

12	Knowledge	How do you convert a percentage to a decimal?	Divide the percentage by 100
	Application 1	Convert 85% into a decimal.	
	Application 2	Convert 89% into a decimal.	

13	Knowledge	With a calculator, how do you increase an amount by a percentage?	Add the percentage to 100%, then multiply by the amount
	Application 1	Increase 109 by 14%	
	Application 2	Increase 76 by 5%	

14	Knowledge	How do you multiply fractions?	Multiply the numerators and multiply the denominators.
	Application 1	Calculate $\frac{7}{8} \times \frac{8}{4}$	
	Application 2	Calculate $\frac{3}{4} \times \frac{5}{8}$	

15	Knowledge	Which operation do we use for the word 'of'?	Multiplication
	Application 1	Write the calculation for 'Two thirds of 30'	
	Application 2	Write the calculation for 'Seven twelfths of 36'	



# Plumber

*Plumbers fit and service hot and cold water systems, heating systems and drainage networks.*

Depending on your qualifications, you'll service and repair heating, water and sanitation systems in domestic and commercial premises.

Your day-to-day tasks may include:

- measuring and planning to give cost and time estimates
- cutting, bending and joining pipes and fittings
- installing water, drainage and heating systems
- finding and fixing faults
- servicing gas and oil-fired central heating systems and radiators
- installing and fixing domestic appliances like showers and washing machines
- dealing with emergency call-outs like boiler breakdowns or blocked drains
- fitting weather-proof materials, joints and flashings to roofs, chimneys and walls

## Working Hours and Environment

As an employee, you'll usually work between 37 and 40 hours a week. You could work evenings, weekends and public holidays, if your firm offers an emergency call-out service.

Self-employed plumbers can work longer hours.

## Skills Required:

You'll need:

- number skills
- the ability to follow technical drawings and plans
- practical skills and the ability to follow safe working practices
- customer care skills

## Entry Requirements

You'll usually need GCSEs (or equivalent) at grades 9 to 4 (A\* to C) in maths, English and science.

You'll also need to get an industry-recognised qualification like a level 2 or 3 Diploma in Domestic Plumbing and Heating. You'll need gas related units at level 3 to work with domestic gas heating systems.

