

# Year 9 Foundation Maths

## Knowledge Organiser

### Term 5

<b>Name:</b>	<b>Class:</b>
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Keyword	Definition
Area	A measure of 2D size.
Perimeter	The length around the outside of a 2D shape.
Compound shape	A shape made by combining other shapes.
Equation	An expression which is equal to another expression.
Elimination	In solving equations, elimination refers to removing something from one side of the equation by doing the same operation to both sides.
Unknown	In algebra, an unknown is a letter which represents a value we don't know.
Subject	The subject of an equation is the letter on its own on one side of the equation.
Grid	A set of horizontal and vertical lines.
Term	In sequences, a term is one of the elements in the sequence.
Sequence	A list of elements in a special order.
Linear/arithmetic	A type of sequence where the difference between terms is constant.
Quadratic	A type of sequence where the second difference between terms is constant.

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



# Term 5 Overview

## Big Questions for the term

### Forming and solving equations

- What did we learn in Year 8?
- How do we re-arrange equations?
- How do we solve simultaneous equation?

### Sequences, functions and graphs

- What have we learnt so far?
- How can we work out the equation of a straight line?
- What does a quadratic look like?

### Area, Perimeter and Volume

- What is perimeter?
- What is circumference?
- How can we work out the area of 2D Shapes?
- What is surface area?
- What is volume?

## Knowledge Retrieval Questions – From Year 7

Unit 7 – Forming and solving equations

None.

Unit 8 – Sequences, functions and graphs

None.

Unit 9 – Area, Perimeter and Volume

None.

## Knowledge Retrieval Questions – From Year 8

### Unit 7 – 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 8 – 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 $y = mx + c$ ?	$m = \text{gradient}$ , $c = \text{y-intercept}$
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 9 – Area, Perimeter and Volume

#	Question	Answer
1	What is the formula for calculating the area of a circle?	$\text{Area} = \pi \times \text{radius}^2$
2	What is the formula for calculating the circumference of a circle?	$\text{Circumference} = \pi \times \text{diameter}$
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?	$\text{Diameter} = 2 \times \text{radius}$
5	What is the formula for the volume of a prism?	$\text{Volume} = \text{Cross-sectional Area} \times \text{Length}$
6	How do you work out the surface area of a prism?	$\text{Surface Area} = \text{Cross-sectional Area} \times 2 + \text{Cross-sectional Perimeter} \times \text{Length}$
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.

## Knowledge Retrieval Questions – For Year 9

### Unit 7 – Forming and solving equations

#	Question	Answer
1	What is the first step for solving simultaneous equations where one of the equations has one unknown?	Solve the equation with a single unknown.

### Unit 8 – Sequences, functions and graphs

#	Question	Answer
1	How do you plot a quadratic graph?	Substitute x values (often -3, -2, -1, 0, 1, 2, 3) into the equation to find y values, then plot those coordinates.

### Unit 9 – Area, Perimeter and Volume

None.

**Term 5 - Homework 1**

#	Type	Question	Answer
1	Knowledge	What operation does a fraction represent?	
	Application 1	What calculation would you do to write 6 tenths as a decimal?	
	Application 2	What calculation would you do to write 4 ninths as a decimal?	

2	Knowledge	How do you use a calculation to work out the answer to another calculation with the same digits?	
	Application 1	Given that $4110 \times 951 = 3908610$ , what is $41.1 \times 95100$	
	Application 2	Given that $5100 \times 570 = 2907000$ , what is $5.1 \times 57000$	

3	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: 18, 11, 12, 18, 20	
	Application 2	What is the median of the following data: 13, 12, 15, 14, 20	

4	Knowledge	What does LCM stand for?	
	Application 1	What is the LCM of 4 and 5?	
	Application 2	What is the LCM of 13 and 8?	

5	Knowledge	How do you share in a ratio if you are given one of the final amounts?	
	Application 1	Carly and Dan share money in the ratio 8:3. Dan gets £180, how much does Carly get?	
	Application 2	Carly and Dan share money in the ratio 5:2. Dan gets £60, how much does Carly get?	

#	Type	Question	Answer
6	Knowledge	How do you find a fraction of an amount?	
	Application 1	Find $\frac{9}{11}$ of 77	
	Application 2	Find $\frac{8}{12}$ of 48	

7	Knowledge	What's the first step when adding or subtracting fractions?	
	Application 1	Complete the first step of the calculation $\frac{2}{8} + \frac{7}{4}$	
	Application 2	Complete the first step of the calculation $\frac{3}{12} + \frac{5}{8}$	

8	Knowledge	What is a significant figure?	
	Application 1	How many significant figures does the number 0.00849 have?	
	Application 2	How many significant figures does the number 0.03716 have?	

9	Knowledge	What is the definition of a multiple?	
	Application 1	Give an example of a multiple of 2	
	Application 2	Give an example of a multiple of 3	

10	Knowledge	How do you find 30% of an amount without a calculator?	
	Application 1	Find 30% of 40	
	Application 2	Find 30% of 80	

#	Type	Question	Answer
11	Knowledge	What is the first step in factorising into single brackets?	
	Application 1	What is the highest common factor of $4x^3$ and $16x^3$ ?	
	Application 2	What is the highest common factor of $2x^3$ and $8x^2$ ?	

12	Knowledge	With a calculator, how do you convert a fraction to a decimal?	
	Application 1	Convert $9/20$ into a decimal.	
	Application 2	Convert $7/100$ into a decimal.	

13	Knowledge	How do you round to 2 decimal places?	
	Application 1	Round the number 41.7317 to 2 decimal places	
	Application 2	Round the number 7.5083 to 2 decimal places	

14	Knowledge	How do you work out the value after adding simple interest?	
	Application 1	Calculate the balance if an account with £4400 got 6% simple interest for 5 years.	
	Application 2	Calculate the balance if an account with £9400 got 3% simple interest for 2 years.	

15	Knowledge	What is a linear sequence?	
	Application 1	Is the following sequence linear? 4, 6, 6, 8	
	Application 2	Is the following sequence linear? 20, 43, 64, 87	

## Workings Space

**Term 5 - Homework 2**

#	Type	Question	Answer
1	Knowledge	What sign would the product of a positive and a negative number have?	
	Application 1	What is the product of 2 and -6?	
	Application 2	What is the product of 3 and -6?	

2	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 2, 5, 8, 11, 14?	
	Application 2	What is the next term in the following sequence 5, 10, 15, 20, 25?	

3	Knowledge	How is division represented algebraically?	
	Application 1	How do you write b divided by 3 algebraically?	
	Application 2	How do you write 3 divided by c algebraically?	

4	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: 13, 13, 17, 10, 12, 20	
	Application 2	What is the median of the following data: 15, 18, 17, 10, 19, 13	

5	Knowledge	How do you simplify the product of two powers with the same base?	
	Application 1	Simplify $13^5 \times 13^3$	
	Application 2	Simplify $18^4 \times 18^5$	

#	Type	Question	Answer
6	Knowledge	What is a denominator?	
	Application 1	What is the denominator in the fraction 5 tenths?	
	Application 2	What is the denominator in the fraction 6 sevenths?	

7	Knowledge	What sign would the product of 2 negative numbers have?	
	Application 1	What is the product of -6 and -6?	
	Application 2	What is the product of -7 and -2?	

8	Knowledge	How do you multiply numbers in standard form?	
	Application 1	Calculate, giving your answer in standard form, $(2 \times 10^{-9}) \times (2 \times 10^{-3})$	
	Application 2	Calculate, giving your answer in standard form, $(3 \times 10^2) \times (2 \times 10^{-2})$	

9	Knowledge	How do you find 30% of an amount without a calculator?	
	Application 1	Find 30% of 30	
	Application 2	Find 30% of 60	

10	Knowledge	What is the definition of a square number?	
	Application 1	What is the 8th square number?	
	Application 2	What is the 16th square number?	

#	Type	Question	Answer
11	Knowledge	How do you round to 3 significant figures?	
	Application 1	Round the number 9.47676 to 3 significant figures	
	Application 2	Round the number 4.50199 to 3 significant figures	

12	Knowledge	What should your answer be if the question tells you to calculate?	
	Application 1	Calculate 2 multiplied by 6	
	Application 2	Calculate 3 multiplied by 2	

13	Knowledge	How do you expand double brackets?	
	Application 1	Expand $(s + 3)(s + 4)$	
	Application 2	Expand $(q + 4)(q + 7)$	

14	Knowledge	What does HCF stand for?	
	Application 1	What is the HCF of 45 and 50?	
	Application 2	What is the HCF of 66 and 57?	

15	Knowledge	How do you expand single brackets?	
	Application 1	Expand $2y(6y - 7)$	
	Application 2	Expand $6x(5x + 3)$	

## Workings Space

**Term 5 - Homework 3**

#	Type	Question	Answer
1	Knowledge	What does the word sum mean?	
	Application 1	What is the sum of 2 and 7?	
	Application 2	What is the sum of 8 and 5?	

2	Knowledge	In algebra, what does "collecting like terms" mean?	
	Application 1	Simplify the following expression: $10p + 6q - 2p + 6q$	
	Application 2	Simplify the following expression: $7p + 6q - 3p + 7q$	

3	Knowledge	What is a denominator?	
	Application 1	What is the denominator in the fraction $\frac{1}{10}$ tenths?	
	Application 2	What is the denominator in the fraction $\frac{2}{7}$ sevenths?	

4	Knowledge	What is the unitary method?	
	Application 1	6 pens cost 36p. Work out the cost of 7 pens.	
	Application 2	6 pens cost 18p. Work out the cost of 7 pens.	

5	Knowledge	How do you use a calculation to work out the answer to another calculation with the same digits?	
	Application 1	Given that $1360 \times 513 = 697680$ , what is $136 \times 51.3$	
	Application 2	Given that $6580 \times 982 = 6461560$ , what is $6.58 \times 982$	

#	Type	Question	Answer
6	Knowledge	How do you write expressions from sentences?	
	Application 1	Write '3 lots of a number add 8' as an expression.	
	Application 2	Write '4 0 than k' as an expression.	

7	Knowledge	How do you convert a percentage to a decimal?	
	Application 1	Write 85% as a decimal.	
	Application 2	Write 199% as a decimal.	

8	Knowledge	How do you round to 2 decimal places?	
	Application 1	Round the number 35.8948 to 2 decimal places	
	Application 2	Round the number 12.5674 to 2 decimal places	

9	Knowledge	What is a linear sequence?	
	Application 1	Is the following sequence linear? 5, 7, 9, 11	
	Application 2	Is the following sequence linear? 24, 48, 72, 96	

10	Knowledge	How do you write a ratio into the form n:1?	
	Application 1	Write the ratio 6:2 into the form n:1	
	Application 2	Write the ratio 6:10 into the form n:1	

## Workings Space