

Year 9 Foundation Maths

Knowledge Organiser

Term 3

Name:	Class:
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Keyword	Definition
Simplify	To make simpler or easier to understand by reducing the size of numbers or the number of terms.
Like terms	Terms which have the exact same letters in an expression.
Expression	One or more terms combined by addition or subtraction.
Function	A special relationship where each input has one output.
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.

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



Term 3 Overview

Big Questions for the term

Simplifying and substitution

- What do we already know about algebra?
- What does it mean to simplify an expression?
- How do we form an expression?
- What is a function machine?
- What does it mean to expand a bracket?
- What does it mean to factorise?
- How do we expand double brackets?

Constructions

- How can we construct triangles?
- How can we bisect a line?
- How can we bisect an angle?
- How can we bisect a line from different points?
- How can we construct different angles?
- How can we map 3D shapes?
- What is a locus of points?

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 n:1?	Divide both numbers in the ratio by the second 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 convert a mixed number to an improper fraction?	Multiply the whole number by the denominator and add it to the numerator
11	How do you find a fraction of an amount?	Divide the amount by the denominator and multiply by the numerator.
12	What does percent mean?	Out of 100
13	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)
14	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.
15	How do you convert a percentage to a decimal?	Divide by 100 (%)

Unit 5 – 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 6 – Constructions

None

Knowledge Retrieval Questions – From Year 8

Unit 3 – Ratio and proportion

None.

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 – Simplifying and substitution

#	Question	Answer
1	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside
2	How do you expand double brackets?	Multiply each of the terms in the first bracket by each of the terms in the second bracket.
3	What is the first step in factorising into single brackets?	Find the highest common factor of the terms.
4	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.

Unit 6 – Constructions

None

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 find 30% of an amount without a calculator?	Find 10% by dividing the amount by 10, then multiply by 3.
2	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.
3	How do you increase an amount by a percentage?	Calculate the percentage of the amount, then add it on to the original amount
4	How do you decrease an amount by a percentage?	Calculate the percentage of the amount, then subtract it from the original amount
5	With a calculator, how do you increase an amount by a percentage?	Add the percentage to 100%, then multiply by the amount
6	With a calculator, how do you decrease an amount by a percentage?	Subtract the percentage from 100%, then multiply by the amount
7	How do you work out the value after adding simple interest?	amount + % of amount \times number of years
8	How do you work out percentage change?	$(\text{Change} \div \text{Original}) \times 100 (\%)$
9	What does it mean to work out a reverse percentage?	You are given the amount AFTER a percentage has been applied and asked to work out the original amount

Unit 5 – Simplifying and substitution

No new questions

Unit 6 – Constructions

#	Question	Answer
1	What does it mean to "construct" in maths?	To draw accurately, using a combination of pencil, ruler, protractor and a pair of compasses.
2	How do you construct a triangle, given one side length and two angles?	Use a ruler to draw the side, measure the angles on either end, draw the lines so they connect.
3	How do you construct a triangle, given two side lengths and the angle between?	Use a ruler to draw one side, measure the angle, use a ruler to draw the second side, join the ends up.
4	How do you construct a triangle, given three side lengths?	Use a ruler to draw one side, use a pair of compasses to draw arcs on either end with radii equal to the two remaining sides, the point they intersect is the third vertex.
5	How do you construct a perpendicular bisector?	Set your compass to more than half way, draw two arcs from each end of the line, connect the two points where the arcs meet
6	How do you construct an angle bisector?	Put your compass on the vertex and make a mark on each line, draw an arc with your compass on each mark, connect the point where the arcs meet with the vertex.

Term 3 - Homework 1

#	Type	Question	Answer
1	Knowledge	With a calculator, how do you decrease an amount by a percentage?	
	Application 1	Decrease 89 by 36%	
	Application 2	Decrease 79 by 8%	

2	Knowledge	What is indirect proportion?	
	Application 1	x and y are in indirect proportion. When $x = 24$ $y = 32$. What would x be if $y = 16$?	
	Application 2	x and y are in indirect proportion. When $x = 20$ $y = 40$. What would x be if $y = 20$?	

3	Knowledge	What is direct proportion?	
	Application 1	x and y are in direct proportion. When $x = 9$ $y = 27$. What would y be if $x = 15$?	
	Application 2	x and y are in direct proportion. When $x = 7$ $y = 14$. What would y be if $x = 11$?	

4	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 5:2. Dan gets £120, how much does Carly get?	
	Application 2	Carly and Dan share money in the ratio 5:4. Dan gets £280, how much does Carly get?	

5	Knowledge	How do you decrease an amount by a percentage?	
	Application 1	Decrease 110 by 10%	
	Application 2	Decrease 110 by 5%	

#	Type	Question	Answer
6	Knowledge	With a calculator, how do you increase an amount by a percentage?	
	Application 1	Increase 119 by 39%	
	Application 2	Increase 61 by 27%	

7	Knowledge	How do you increase an amount by a percentage?	
	Application 1	Increase 60 by 5%	
	Application 2	Increase 90 by 20%	

8	Knowledge	How do you increase an amount by 40% without a calculator?	
	Application 1	Increase 200 by 40%	
	Application 2	Increase 240 by 40%	

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

10	Knowledge	What does it mean to work out a reverse percentage?	
	Application 1	In a sale where prices are cut by 30% a pair of trainers cost £70.00, work out the original price.	
	Application 2	In a sale where prices are cut by 40% a pair of trainers cost £30.00, work out the original price.	

#	Type	Question	Answer
11	Knowledge	How do you work out the value after adding simple interest?	
	Application 1	Calculate the balance if an account with £6700 got 5% simple interest for 5 years.	
	Application 2	Calculate the balance if an account with £4000 got 6% simple interest for 5 years.	

12	Knowledge	How do you share in a ratio if you are given the difference?	
	Application 1	Anna and Ben share money in the ratio 8:1. Anna gets £210 more than Ben, how much does Anna get?	
	Application 2	Anna and Ben share money in the ratio 5:4. Anna gets £40 more than Ben, how much does Anna get?	

13	Knowledge	What is a scale factor?	
	Application 1	Corresponding sides on two similar shapes are 9cm and 18cm. What is the scale factor?	
	Application 2	Corresponding sides on two similar shapes are 6cm and 24cm. What is the scale factor?	

14	Knowledge	How do you use exchange rates to convert money?	
	Application 1	The exchange rate for GBP to USD is 1:1.25. How many Dollars would get for £380?	
	Application 2	The exchange rate for GBP to USD is 1:1.29. How many Dollars would get for £220?	

15	Knowledge	How do you work out percentage change?	
	Application 1	Over a year, your bank account goes from £10500 to £8500, calculate the percentage change.	
	Application 2	Over a year, your bank account goes from £8400 to £10200, calculate the percentage change.	

Workings Space

Term 3 - Homework 2

#	Type	Question	Answer
1	Knowledge	How do you increase an amount by 40% without a calculator?	
	Application 1	Increase 200 by 40%	
	Application 2	Increase 160 by 40%	

2	Knowledge	What is direct proportion?	
	Application 1	x and y are in direct proportion. When $x = 5$ $y = 20$. What would y be if $x = 15$?	
	Application 2	x and y are in direct proportion. When $x = 10$ $y = 30$. What would y be if $x = 13$?	

3	Knowledge	With a calculator, how do you increase an amount by a percentage?	
	Application 1	Increase 75 by 34%	
	Application 2	Increase 59 by 25%	

4	Knowledge	How do you increase an amount by a percentage?	
	Application 1	Increase 80 by 30%	
	Application 2	Increase 60 by 35%	

5	Knowledge	How do you use exchange rates to convert money?	
	Application 1	The exchange rate for GBP to USD is 1:1.24. How many Pounds would get for \$508.40?	
	Application 2	The exchange rate for GBP to USD is 1:1.21. How many Pounds would get for \$326.70?	

#	Type	Question	Answer
6	Knowledge	What is a scale factor?	
	Application 1	Corresponding sides on two similar shapes are 10cm and 25cm. What is the scale factor?	
	Application 2	Corresponding sides on two similar shapes are 9cm and 36cm. What is the scale factor?	

7	Knowledge	How do you work out the value after adding simple interest?	
	Application 1	Calculate the balance if an account with £9500 got 6% simple interest for 4 years.	
	Application 2	Calculate the balance if an account with £7700 got 3% simple interest for 3 years.	

8	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 9:1. Dan gets £80, how much does Carly get?	
	Application 2	Carly and Dan share money in the ratio 2:1. Dan gets £240, how much does Carly get?	

9	Knowledge	How do you work out percentage change?	
	Application 1	Over a year, your bank account goes from £6300 to £10200, calculate the percentage change.	
	Application 2	Over a year, your bank account goes from £5600 to £10200, calculate the percentage change.	

10	Knowledge	With a calculator, how do you decrease an amount by a percentage?	
	Application 1	Decrease 92 by 1%	
	Application 2	Decrease 73 by 26%	

#	Type	Question	Answer
11	Knowledge	What does it mean to work out a reverse percentage?	
	Application 1	In a sale where prices are cut by 10% a pair of trainers cost £72.00, work out the original price.	
	Application 2	In a sale where prices are cut by 30% a pair of trainers cost £35.00, work out the original price.	

12	Knowledge	What is indirect proportion?	
	Application 1	x and y are in indirect proportion. When $x = 16$ $y = 16$. What would x be if $y = 8$?	
	Application 2	x and y are in indirect proportion. When $x = 24$ $y = 32$. What would x be if $y = 16$?	

13	Knowledge	How do you share in a ratio if you are given the difference?	
	Application 1	Anna and Ben share money in the ratio 5:3. Anna gets £140 more than Ben, how much does Anna get?	
	Application 2	Anna and Ben share money in the ratio 2:1. Anna gets £240 more than Ben, how much does Anna get?	

14	Knowledge	How do you find 30% of an amount without a calculator?	
	Application 1	Find 30% of 90	
	Application 2	Find 30% of 40	

15	Knowledge	How do you decrease an amount by a percentage?	
	Application 1	Decrease 80 by 25%	
	Application 2	Decrease 50 by 35%	

Workings Space

Term 3 - Homework 3

#	Type	Question	Answer
1	Knowledge	How do you work out percentage change?	
	Application 1	Over a year, your bank account goes from £7700 to £10200, calculate the percentage change.	
	Application 2	Over a year, your bank account goes from £8400 to £6800, calculate the percentage change.	

2	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 10:3. Dan gets £90, how much does Carly get?	
	Application 2	Carly and Dan share money in the ratio 8:1. Dan gets £70, how much does Carly get?	

3	Knowledge	What is a scale factor?	
	Application 1	Corresponding sides on two similar shapes are 6cm and 12cm. What is the scale factor?	
	Application 2	Corresponding sides on two similar shapes are 8cm and 20cm. What is the scale factor?	

4	Knowledge	How do you increase an amount by 40% without a calculator?	
	Application 1	Increase 200 by 40%	
	Application 2	Increase 160 by 40%	

5	Knowledge	How do you decrease an amount by a percentage?	
	Application 1	Decrease 50 by 5%	
	Application 2	Decrease 120 by 10%	

#	Type	Question	Answer
6	Knowledge	How do you share in a ratio if you are given the difference?	
	Application 1	Anna and Ben share money in the ratio 7:3. Anna gets £200 more than Ben, how much does Anna get?	
	Application 2	Anna and Ben share money in the ratio 9:4. Anna gets £350 more than Ben, how much does Anna get?	

7	Knowledge	What is direct proportion?	
	Application 1	x and y are in direct proportion. When $x = 10$ $y = 20$. What would x be if $y = 22$?	
	Application 2	x and y are in direct proportion. When $x = 8$ $y = 24$. What would y be if $x = 11$?	

8	Knowledge	How do you increase an amount by a percentage?	
	Application 1	Increase 80 by 25%	
	Application 2	Increase 100 by 5%	

9	Knowledge	With a calculator, how do you increase an amount by a percentage?	
	Application 1	Increase 62 by 40%	
	Application 2	Increase 93 by 24%	

10	Knowledge	What does it mean to work out a reverse percentage?	
	Application 1	In a sale where prices are cut by 40% a pair of trainers cost £30.00, work out the original price.	
	Application 2	In a sale where prices are cut by 10% a pair of trainers cost £63.00, work out the original price.	

#	Type	Question	Answer
11	Knowledge	How do you work out the value after adding simple interest?	
	Application 1	Calculate the balance if an account with £5800 got 3% simple interest for 3 years.	
	Application 2	Calculate the balance if an account with £8000 got 2% simple interest for 4 years.	

12	Knowledge	What is indirect proportion?	
	Application 1	x and y are in indirect proportion. When $x = 24$ $y = 30$. What would x be if $y = 18$?	
	Application 2	x and y are in indirect proportion. When $x = 32$ $y = 32$. What would x be if $y = 16$?	

13	Knowledge	How do you find 30% of an amount without a calculator?	
	Application 1	Find 30% of 90	
	Application 2	Find 30% of 50	

14	Knowledge	How do you use exchange rates to convert money?	
	Application 1	The exchange rate for GBP to USD is 1:1.24. How many Pounds would get for \$607.60?	
	Application 2	The exchange rate for GBP to USD is 1:1.25. How many Dollars would get for £440?	

15	Knowledge	With a calculator, how do you decrease an amount by a percentage?	
	Application 1	Decrease 77 by 31%	
	Application 2	Decrease 84 by 36%	

Workings Space