

# Year 8 Maths

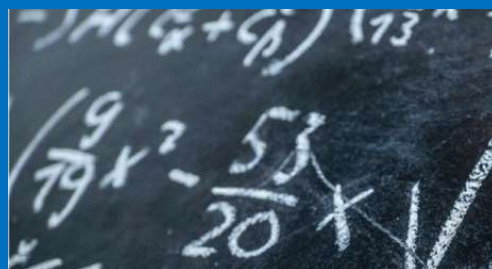
## Knowledge Organiser

### Term 3

<b>Name:</b>	<b>Class:</b>
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Keyword	Definition
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.
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.
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 3 Overview

## Big Questions for the term

### Fractions, decimals and percentages

- What did we learn in Year 7?
- How do we convert Fractions, Decimals and Percentages?
- What is a decimal multiplier and how can they help with calculations?

### Forming and solving equations

- How do we form expressions and equations?
- How can we solve a linear equations?
- What is the subject of a formula?
- How can function machines help us re-arrange formulas?

## Knowledge Retrieval Questions – From Year 7

### 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 $\leftrightarrow$ D
4	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by S $\leftrightarrow$ D
5	With a calculator, how do you convert a percentage to a decimal?	Type the percentage in and press =, followed by S $\leftrightarrow$ D
6	With a calculator, how do you convert a percentage to a fraction?	Type the percentage in and press =

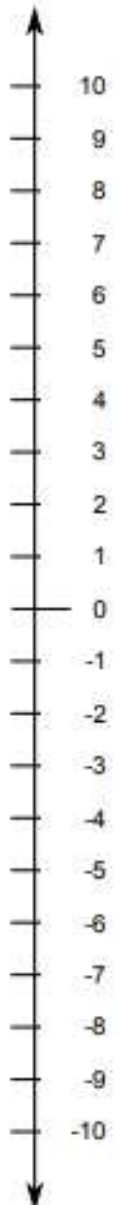
### Unit 5 – Forming and solving equations

#	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.

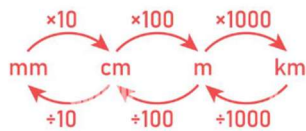
## Multiplication Chart

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

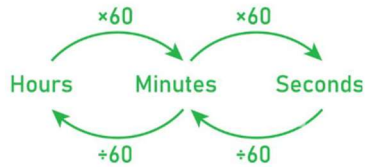
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths	ten thousandths	hundred thousandths
HTH	TTh	Th	H	T	0	.	t	h	th	tth	hth
100,000	10,000	1,000	100	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$
Whole Number Part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



### Length



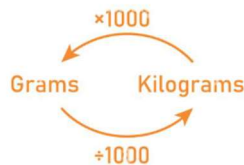
### Time



### Volume



### Mass



## Remote-Learning

If you are absent from school, lesson work can be found on your year group Teams channel: files -> class materials -> maths

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

**Term 3 - Homework 1**

#	Type	Question	Answer
1	Knowledge	What does HCF mean?	Highest Common Factor
	Application 1	What is the highest common factor of 10 and 25?	
	Application 2	What is the highest common factor of $10x$ and $25x$ ?	

2	Knowledge	How do you convert a percentage to a decimal?	Divide by 100
	Application 1	Convert 4% into a decimal.	
	Application 2	Convert 8% into a decimal.	

3	Knowledge	What does LCM stand for?	Lowest Common Multiple
	Application 1	What is the lowest common multiple of 10 and 15?	
	Application 2	What is the lowest common multiple of 6 and 7?	

4	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	Convert $\frac{2}{5}$ into a percentage.	
	Application 2	Convert $\frac{2}{20}$ into a percentage	

5	Knowledge	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside
	Application 1	Expand $2(8r + 1)$	
	Application 2	Expand $6y(8 - 1)$	

#	Type	Question	Answer
6	Knowledge	With a calculator, how do you convert a decimal to a fraction?	Type the decimal in and press =, then press the format button
	Application 1	Convert 0.6 into a fraction.	
	Application 2	Convert 0.3 into a fraction.	

7	Knowledge	What is a numerator?	The top number in a fraction
	Application 1	What is the numerator in three fifths?	
	Application 2	Write a fraction with a numerator of 8.	

8	Knowledge	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by Format
	Application 1	Convert $\frac{67}{100}$ into a decimal.	
	Application 2	Convert $\frac{51}{100}$ into a decimal.	

9	Knowledge	With a calculator, how do you convert a fraction to a percentage?	Multiply by 100 (%) and press format
	Application 1	Convert $\frac{37}{50}$ into a percentage.	
	Application 2	Convert $\frac{13}{20}$ into a percentage.	

10	Knowledge	With a calculator, how do you convert a decimal to a percentage?	Multiply by 100 (%)
	Application 1	Convert 0.69 into a percentage.	
	Application 2	Convert 0.58 into a percentage.	

#	Type	Question	Answer
11	Knowledge	In algebra, what does "collecting like terms" mean?	Adding or subtracting terms with the exact same letters
	Application 1	Simplify by collecting like terms $3p + 4p - 3t - 3t$	
	Application 2	Simplify by collecting like terms $9p - 4p + 3t - 3t$	

12	Knowledge	The symbol for which operation is not written in algebra?	Multiplication
	Application 1	Write in simplified form $4 \times f$	
	Application 2	Write in simplified form $g \times t$	

13	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 9 <sup>th</sup> square number?	
	Application 2	What is the 11 <sup>th</sup> square number?	

14	Knowledge	How do you simplify the product of two powers with the same base?	Add the indices together
	Application 1	Simplify $4^3 \times 4^7$	
	Application 2	Simplify $4^{-2} \times 4^7$	

15	Knowledge	How do you simplify the division of two powers with the same base?	Subtract the second index from the first
	Application 1	Simplify $4^3 \div 4^7$	
	Application 2	Simplify $4^{-2} \div 4^7$	

**Term 3 - Homework 2**

#	Type	Question	Answer
1	Knowledge	With a calculator, how do you convert a decimal to a percentage?	Multiply by 100 (%)
	Application 1	Convert 0.19 into a percentage.	
	Application 2	Convert 0.14 into a percentage.	

2	Knowledge	With a calculator, how do you convert a percentage to a fraction?	Type the percentage in and press =, then press format
	Application 1	Convert 43% into a fraction.	
	Application 2	Convert 14% into a fraction.	

3	Knowledge	How do you simplify the product of two powers with the same base?	Add the indices together
	Application 1	Simplify $a \times a^7$	
	Application 2	Simplify $b^{-2} \times b^7$	

4	Knowledge	How do you simplify the division of two powers with the same base?	Subtract the second index from the first
	Application 1	Simplify $a^3 \div a^7$	
	Application 2	Simplify $a \div a^7$	

5	Knowledge	With a calculator, how do you convert a decimal to a fraction?	Type the decimal in and press =, then press format
	Application 1	Convert 0.15 into a fraction.	
	Application 2	Convert 0.62 into a fraction.	

#	Type	Question	Answer
6	Knowledge	With a calculator, how do you convert a fraction to a percentage?	Multiply by 100 (%) and press format
	Application 1	Convert $9/50$ into a percentage.	
	Application 2	Convert $11/100$ into a percentage.	

7	Knowledge	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside
	Application 1	Expand $5x(5x + 5)$	
	Application 2	Expand $3(8w - 7)$	

8	Knowledge	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.
	Application 1	Write this as an expression: $w$ subtract $q$ all divided by $a$	
	Application 2	Write this as an expression: $y$ add $p$ all divided by $c$	

9	Knowledge	With a calculator, how do you convert a percentage to a decimal?	Type the percentage in and press =, followed by format
	Application 1	Convert 87% into a decimal.	
	Application 2	Convert 33% into a decimal.	

10	Knowledge	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by format
	Application 1	Convert $41/50$ into a decimal.	
	Application 2	Convert $23/100$ into a decimal.	

#	Type	Question	Answer
11	Knowledge	What is a cube number?	The product of 3 equal numbers.
	Application 1	Evaluate $2^3$	
	Application 2	Evaluate $5^3$	

12	Knowledge	What is the definition of a multiple?	A number in another number's times table.
	Application 1	What is the 7 <sup>th</sup> multiple of 3?	
	Application 2	What is the 9 <sup>th</sup> multiple of 5?	

13	Knowledge	What does the word product mean?	The result of a multiplication.
	Application 1	What is the product of 3 and 7?	
	Application 2	What is the product of 4 and 9?	

14	Knowledge	How is division represented algebraically?	As a fraction
	Application 1	Write algebraically 4 divided by c	
	Application 2	Write algebraically g divided by 10	

15	Knowledge	What is the definition of a factor?	A number which divides another number exactly.
	Application 1	List the factors of 10	
	Application 2	List the factors of 24	

**Term 3 - Homework 3**

#	Type	Question	Answer
1	Knowledge	What is the definition of a factor?	A number which divides another number exactly.
	Application 1	List the factors of 36	
	Application 2	List the factors of 18	

2	Knowledge	How is division represented algebraically?	As a fraction
	Application 1	Write algebraically 5 divided by c	
	Application 2	Write algebraically j divided by 10	

3	Knowledge	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.
	Application 1	Write this as an expression: x add r all multiplied by b	
	Application 2	Write this as an expression: y add r all divided by c	

4	Knowledge	What does it mean to "form an equation"?	Write the sentence as an equation, you may need to remember a formula first.
	Application 1	I think of a number, I multiply it by 3 and add 7 this equals 13	
	Application 2	I think of a number, I multiply it by 4 and add 2 this equals 18	

5	Knowledge	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.
	Application 1	Rearrange the formula $h = cq - x$ making x the subject.	
	Application 2	Rearrange the formula $g = x + cq$ making x the subject.	

#	Type	Question	Answer
6	Knowledge	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside
	Application 1	Expand $3(7u + 9)$	
	Application 2	Expand $3(2r - 5)$	

7	Knowledge	What does it mean to "solve an equation"?	Find the value or values of the unknown which make the equation correct.
	Application 1	Solve $a \div 2 = 9$	
	Application 2	Solve $a \times 3 = 36$	

8	Knowledge	How do you solve an equation with an unknown on one side?	Undo each of the parts of the equation, in reverse BIDMAS order.
	Application 1	Solve $5b + 5 = 15$	
	Application 2	Solve $8b + 5 = 21$	

9	Knowledge	How do you expand double brackets?	Multiply each of the terms in the first bracket by each of the terms in the second bracket.
	Application 1	Expand $(p + 2)(p + 8)$	
	Application 2	Expand $(r + 1)(r + 8)$	

10	Knowledge	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by format
	Application 1	Convert $23/50$ into a decimal.	
	Application 2	Convert $32/100$ into a decimal.	

#	Type	Question	Answer
11	Knowledge	With a calculator, how do you convert a fraction to a percentage?	Multiply by 100 (%) and press format
	Application 1	Convert $\frac{8}{50}$ into a percentage.	
	Application 2	Convert $\frac{10}{100}$ into a percentage.	

12	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 7 <sup>th</sup> square number?	
	Application 2	What is the 3rd square number?	

13	Knowledge	What does HCF mean?	Highest Common Factor
	Application 1	What is the highest common factor of 12 and 24?	
	Application 2	What is the highest common factor of $12x$ and $24x$ ?	

14	Knowledge	How do you convert a percentage to a decimal?	Divide by 100
	Application 1	Convert 12% into a decimal.	
	Application 2	Convert 2.5 % into a decimal.	

15	Knowledge	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.
	Application 1	Write this as an expression: w subtract y all divided by a	
	Application 2	Write this as an expression: y add u all divided by c	



# Quantity Surveyor

*Quantity surveyors make sure that legal and quality standards are met in construction projects, and that the project is financed correctly.*

Your day-to-day tasks may include:

- helping to estimate costs, quantities, and project timelines
- managing subcontractors (like plumbers, painters, and electrical contractors)
- negotiating contracts and work schedules
- offering advice on disputes and legal matters
- writing reports
- staying up-to-date with developments in construction methods and materials
- following health and safety and building regulations

## Working Hours and Environment

You'll usually work Monday to Friday, 8.30am to 5pm, including evenings and weekends. The majority of the time, you will be working either in an office or on building sites. Depending on the company, you may be able to complete some of your tasks remotely.

It's important that you're happy to travel for work, and that you're somebody who enjoys working outside. You will also need to be confident making important decisions.

You may also need to have a driving license

## Entry Requirements

The qualifications you'll need depend on the country you'd like to work in. For example, in the UK, you'll need to study a degree or a professional qualification that's been accredited by the Royal Institution of Chartered Surveyors, like a quantity surveying degree or a postgraduate conversion course. You may also need to complete additional qualifications.

Useful subjects for this degree are construction, geography, economics, mathematics, land studies, and structural or civil engineering.

## Skills Required:

You'll need to be confident in the following skills:

- Teamwork – you'll likely work with lots of different teams across a project and have lots of meetings.
- Problem solving – due to the complexity of infrastructure projects, problem solving is key. You could be faced with, for example, working out the cost associated with archaeology works, where you'll need to develop various cost estimates to support in evaluating design choices.
- Numeracy – this role is very numerical, primarily looking at cost data. You'll often use software such as Microsoft Excel to support in analysing data.
- Communication – effective communication across commercial, delivery, and design teams will help you get familiar with the design and effective management of the cost.

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